

# Amateur Radio

Volume 80  
Number 12  
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## Microwave activity in SE VK4

- Amateur RADAR reveals new propagation information
- Foundation Corner: Navigating the second-hand VHF/UHF radio market
- Amateur radio to the rescue

ISSN 0002-6859

12



Season's  
Greetings



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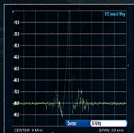
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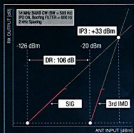
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# Amateur Radio

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*This month's cover*

Summer is traditionally the season for VHF, UHF and microwave operations, with increased likelihood of enhanced propagation. Some prepare for the season by getting out for a fun day of checking the gear before the contest season commences. Our cover shows the set-up at VK4OE/2 during the recent Microwave Activity Day in SE Queensland. Antennas for all microwave bands from 1.2 to 24 GHz are visible. Photo by Doug Friend VK4OE.

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## Contributions to Amateur Radio



Amateur Radio is a forum for WIA members' amateur radio experiments, experiences, opinions and news. Manuscripts with drawings and/or photos are welcome and will be considered for publication. Articles attached to email are especially welcome. The WIA cannot be responsible for loss or damage to any material. Information on house style is available from the Editor.

### Back Issues

Back issues are available directly from the WIA National Office (until stocks are exhausted), at \$8.00 each (including postage within Australia) to members.

### Photostat copies

If back issues are unavailable, photocopies of articles are available to members at \$2.50 each (plus an additional \$2 for each additional issue in which the article appears).

### Disclaimer

The opinions expressed in this publication do not necessarily reflect the official view of the WIA and the WIA cannot be held responsible for incorrect information published.

## Amateur Radio Service

A radio communication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs; that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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## Editorial

Peter Freeman VK3PF

### Another year done

Where has the year gone – Christmas is almost upon us, with the New Year celebrations to follow shortly thereafter. As this edition of *AR* is being prepared, we have seen the running of “the race that stops a nation” and the hamfest season is back in full swing before its end of year pause.

I trust that you all managed to cross a few tasks off the “to do” list. Personally, several big items have not been tackled. However, I have managed to complete several tasks. Of course, several other new items have been added. As most will have gathered from my last missive, I have become bitten by the SOTA bug. That has also stimulated lots of thoughts and experimentation with antennas for human-carried portable gear, as opposed to operations based close to a vehicle. The latest effort is a lightweight Yagi for 2 m, based on a design by DK7ZB. The result, which I may write up down the track once its performance has been checked, is a seven metre mast for holding the centre of an inverted V HF dipole, or a 6 element Yagi for 2 m with a four metre mast, with a total mass of about 1.3 kg. Not bad when you consider that the core – a seven metre “squid pole” – comes in at one kilogram by itself. Add to that the mass of the HF antenna and feedline/s, plus the radio and at least one battery, and it starts to add up. If the Yagi works as expected, then it should all make a reasonable, flexible SOTA station which is not too taxing to carry up the hill.

### Volunteers needed

As noted last month, Phil VK4BAA has contributed his last Contests column with this issue. So we need a new columnist ASAP. The next issue commences preparation at the start

of the New Year, so we do not have much time to ensure that we have an overview of upcoming contests and recent results. We will publish the rules and results that are supplied, but we really need someone who is willing to put together some words to give us the overview and perhaps some ideas and encouragement to participate. Please direct your expressions of interest to me at [editor@wia.org.au](mailto:editor@wia.org.au)

The 2013 Callbook has been available for a couple of weeks and is hopefully selling well. As I have previously indicated, Greg VK3VT is unable to continue the task for next year and we are seeking a new Editor for the Callbook. Thanks to those that have already expressed interest. Anyone else interested needs to “put up their hand” very quickly to be in consideration.

### Season's Greetings

Regardless of one's personal beliefs, the end of year is a season of celebration. One cannot escape the advertising promoting gift, food and drink purchases. Most celebrate the coming of the New Year, some more enthusiastically and “harder” than others. Some hope that “Santa” brings a nice gift for the shack.

Perhaps the key is to ensure that you enjoy the season and make contact with family and friends. It might also be an opportune time to revise that “to do” list and make more definite plans to ensure that more of the items are completed in the coming months!

I trust that you all have a safe festive season and a prosperous New Year.

Cheers,

Peter VK3PF





## WIA comment

Phil Wait VK2ASD

### Business as Usual

I can't say that this time has been a particularly joyful one for us at the WIA following the recent passing of our past-President, Michael Owen VK3KI (SK), although with a lot of dedication from WIA Manager Mal Brooks, our office staff Margaret and Dianne, and our team of overworked volunteers, I can say that the WIA is in fine shape.

For instance, in the last month we have participated in two very major international activities.

Dale Hughes VK1DSH attended an ITU working group in Geneva. Dale is the Chair of that working group which is investigating the possibility of a new amateur service allocation between 5250 & 5450 kHz. The ITU is also addressing issues associated with short-range vehicle radar in the 78 GHz band, and a telegraphic alphabet for data communication by phase shift keying at 31 baud in the amateur and amateur-satellite services.

As Chair, Dale's tasks include the drafting of several documents which will cover the characteristics of typical amateur operations and their compatibility with existing services within the proposed band. These 'sharing studies' are a very important aspect of the process as they will largely determine whether or not a 5 MHz amateur allocation is possible.

Dale's work is long and arduous, as everyone has to have their say and there is strong opposition from some prominent administrations to any new amateur allocations, largely depending on the politics and ideologies of various countries. Dale also keeps his ears to the ground

for any other emerging issues which may affect amateur radio.

Also last month, Geoff Atkinson VK3TL and Peter Young VK3MV represented the WIA at the IARU Region 3 meeting in Vietnam. The WIA seeks an improved funding model for Region 3 in order to ensure the Amateur Service continues to be adequately represented internationally on spectrum allocation issues, and is capable of protecting its primary spectrum allocations through an effective global intruder monitoring system.

Other IARU Region 3 issues of interest to the WIA are the development of better bi-lateral arrangements for amateur emergency communications and disaster recovery, and encouragement of amateur qualification training activities in developing countries.

Although this long-term international work is vitally important for amateur radio, and quite expensive, it often goes largely unnoticed. As a WIA member your money is going to these vital activities in support of amateur radio, and unfortunately you are in effect subsidising others who choose not to be WIA members. Such is the nature of the beast.

Closer to home, our activities are more tangible. I must say that this magazine is looking good, our training and assessment activities are continuing with excellent results, and our relationship with the regulator is strong.

Although membership continues to rise slowly, for the first time in

many years the WIA may show a small financial loss. Nothing serious, but a trend that must be addressed. The reasons are probably many and varied, but an ageing membership, the general economic conditions encouraging people to save rather than spend, and a fall in the number of new Foundation licensee's entering the hobby are all contributing factors.

It would be easy to simply raise membership and service fees, but given the profile of our membership and the tenuous state of the economy, that would probably be counter-productive at this time. We could reduce expenses by cutting activity and member services, but that's never a good plan for the health of any organisation.

The WIA Board has made a decision to introduce a new 'cloud' based membership management system called MEMNET. A cloud system is one where the information system is developed, provided, upgraded and maintained by an independent software company, thus relieving the WIA and its volunteers of that responsibility.

The MEMNET system will allow on-line membership access to all WIA services and facilities, and will also provide a targeted information service to members depending on their interests and activities. For instance if you are a contestor, MEMNET can automatically send you emails about the latest contest and propagation conditions, or you might like to get news items about new wireless technologies.

Continued on page 5

## Antenna masts in NSW – Another WIA submission

Roger Harrison VK2 ZRH responds us with the following update:

The WIA has lodged another submission to the latest stage of the NSW Planning System Review in a continuing effort to have amateur antenna masts classified under exempt or complying development.

This latest submission responds to the Draft Policies and Plans posted on the NSW Planning & Infrastructure department's website for public comment over 12 October to 9 November 2012.

The Institute has made two previous submissions to the Review; first to the Listening & Scoping Phase in November 2011, and second, in response to the Issues Paper, in March 2012.

The WIA's submission expresses disappointment that consideration of planning exemptions for amateur radio antenna masts was not included in the draft policy and reiterates the original proposal.

The latest submission can be downloaded and viewed from the WIA website.

## Radio amateurs battle to get messages through council red tape

The following item by reporter Nicole Hasham appeared in the Sydney Morning Herald on 31st October:

With just a wire antenna, a slice of the airwaves and his own technical guile, Compton Allen is a one-man radio mogul.

He doesn't rely on the internet, or a mobile phone. From his home in Ryde, the amateur radio buff - call sign VK2HRX - can transmit messages to Parramatta or New York. Others contact the international space station, or even bounce signals off the moon.

But one source of earthbound interference impedes Mr Allen, and

many of the state's 4300 licensed amateur radio users - the burden of council red tape.

"[Council regulation] restricts the type of antenna I can put up ... I sometimes find it hard to talk to stations in northern Europe and Antarctica and some places in Australia," Mr Allen said.

"The application process for antenna towers can be long and laborious, cost considerable money and involve all sorts of technical requirements which are probably not necessary."

The century-old pursuit of amateur radio involves sending and receiving data over selected frequency bands. Traditionalists transmit Morse code or voice; the new breed either circumvents the internet by sending digital data over the airwaves, or uses the web to link radio systems around the world.

Far from simply a backyard hobby, amateur radio can be critical during natural disasters.

An amateur radio operator, Bob Hooper, was reportedly the first to tell the world Darwin had been hit by Cyclone Tracy, and enthusiasts helped authorities communicate during the Victorian Black Saturday bushfires.

"When the phone system melts or collapses or gets overused, we can go on to our radio frequencies and get messages through that way," Mr Allen said.

In a submission to the state government planning review, the Coalition of Radio Amateur Experimenters called for smaller antennas used by enthusiasts - those 10 metres from the ground, or five metres above the roof line - to be exempt from development consent. Masts up to 15 metres from the ground should be more easily approved, it said.

The CRAE convener, Roger Harrison - call sign VK2ZRH - said antennas rising above the

streetscape improved efficiency and avoided interference from sources such as electricity mains and household appliances.

Under state planning policy, council permission must be sought to erect aerials more than 1.8 metres above roof level, which can require an onerous development application.

Mark Plowman, an IT consultant from Davidson - call sign VK2MP - erected a taller-style lattice mast in his backyard, which he says falls under council height limits. He communicates as far afield as Russia and the Australian Antarctic base.

"You get to build your own antennas and experiment. It gives you a sense of achievement to contact someone across the world," he said.

A planning department spokesman said no change to amateur radio aerial regulation was proposed, and that "allowing higher aerials without a detailed development application process could cause unacceptable streetscape and neighbourhood safety issues".

## Hurricane Sandy - an update

The death toll from Sandy continues to grow to 63 and it has caused billions of dollars of damage and economic disruption on its wide path of destruction. The super storm reached the northeast of the US to come ashore near Atlantic City closing that city including its famed casinos, heading for New Jersey and New York City forcing Wall Street with its stock exchange out of action. A huge storm with punishing winds, record flooding, heavy snowfall and massive blackouts, wiped out homes along the New Jersey shore, submerged parts of New York City, and dumped snow as far south as the Carolinas.

The Hurricane Watch Net was activated during the super

storm with amateur radio station WX4NHC, but has now closed down. It collected reports of significant damage both on air, and through VoIP, EchoLink and IRLP. Throughout the disaster numerous trained and well prepared ARES groups set up emergency communications nets to handle the storm in partnership with the relief agencies. They had plenty of advance warning to be well placed with equipment, go-kits and personnel at disaster shelters for evacuations, emergency operation centres, hospitals and other places.

Before reaching the USA it had already caused death and mayhem throughout the Caribbean including Cuba, Dominica, Haiti and Jamaica. Relief efforts are continuing with the flooding starting to subside and blue skies appearing. Flights are resuming slowly and the New York Stock Exchange got back to business on generator power. The railway subways were closed as people walked across the Brooklyn Bridge into Manhattan to return home and survey the damage.

### IARU Region 3 conference

The IARU Region 3 conference was held in the Kimdo-Royal Hotel, Ho Chi Minh City from November 5 to 9.

A record number of 16 regional societies were represented by over 80 delegates and observers. Also attending were IARU President Tim

Ellam VE6SH, and representatives from Regions 1 & 2, as well as IARU Secretary Rod Stafford W6ROD. The WIA delegate was Geoff Atkinson VK3TL, together with Peter Young VK3MV, who is also the Regional Monitoring Service Coordinator.

The conference was hosted by the Vietnam Amateur Radio Club (VARC). This is a very small member society with some 50 enthusiastic members who did a magnificent job hosting this significant international event.

The theme of this conference was emergency communications and preparedness where a significant number of papers were submitted by member societies. Other reports from Regional Coordinators were also presented. A number of important administrative issues were discussed and agreements reached. Most notable was the decision to place the Region 3 finances on a more stable footing and the appointment of an additional Director, taking the number of Directors from 5 to 6.

At the conclusion of the conference six new Directors were elected for the next 3 years. The WIA is pleased to announce Geoff Atkinson VK3TL was appointed a Region 3 Director, Peter Young VK3MV will continue in his role as IARU R3 Monitoring System Co-ordinator, as will Jim Linton

VK3PC as Region 3 Chairman of the Disaster Communication Committee. The conference accepted the proposal from the Indonesian society, ORARI, the Amateur Radio Organisation of Indonesia, to host the next region 3 conference in Yogyakarta Indonesia sometime late 2015.

WIA president, Phil Wait, VK2ASD said that there were many good outcomes from the conference and it continues the long history of support by the WIA for the IARU Region 3 affairs.

### Michael J. Owen, VK3KI, Award announced

The IARU Administrative Council announced a new award in memory of Michael Owen VK3KI. "The Michael J. Owen, VK3KI, Award" was established to recognize an individual or individuals that best exemplify the dedication and hard work of IARU volunteers.

In addition, at the Region 3 conference, the WIA proposed an annual award/trophy to be awarded to the highest individual operator score located in Region 3 in the IARU HF Contest. Further details will be announced before the next IARU HF Contest.

This proposal was warmly endorsed.



## WIA comment

Continued from page 3

The MEMNET system will allow you to view and edit your personal details on-line, pay your membership account and enter your particular areas of interest. The MEMNET system is expected to achieve administrative efficiencies which effectively pay for the system in the first year of operation and then provide a significant saving in years to come.

Naturally a telephone service will also be available for people who prefer it that way, but the MEMNET system will be quicker and more efficient.

So, you can see there are a lot of things happening at the WIA. It's promising to be an exciting and busy year and our next issue of AR will have more details on our international work and the MEMNET

system. From all of us at the WIA, have a very merry Christmas and lots of DX. I would particularly like to thank all those people whose support and just plain hard work has ensured a very smooth transition over the past few difficult months.

Phil Wait VK2ASD



# Growth in microwaves in SE Queensland

Doug Friend VK4OE

Sunday 28 October saw quite a number of VK4 radio amateurs interested in the microwave bands out operating on hilltops and other elevated places in the Brisbane VHF Group's 2012 Microwave Activity Day. Here is a short report prepared by Doug Friend VK4OE, with input gratefully received from other fellows active on the day.

There is no doubt about it that amateur microwave activity is presently growing in SE Queensland. Several factors have been contributing to this definite growth in recent times. Aided by the availability of Australian designs and kits for several types of module that form parts of working microwave transverters and stations (VK3XDK and MiniKits), numbers of VK4s

have 'caught the bug'. Different kits and ready-made modules available from Germany or the USA are also in use.

On top of that, in recent years two microwave test and tune-up days and three microwave activity days organised by the Brisbane VHF Group have helped inspire more folk to give microwaves a try, not to mention internet resources, VK-Logger facilities, GippsTech, etc. Building one's own equipment and successfully using home-built gear on the air is immensely satisfying whichever band it's for. Even more

so when the gear is for the microwave bands – 1296 MHz and above.

In 2012 two good microwave events have been run. First, in September, there was the test and tune-up day. A large number of amateurs brought objects and projects along for testing

and optimisation. This was a great day and some excellent videos relating to it have been produced by Adam VK4GHZ. They can be viewed by going to: <http://www.youtube.com/watch?v=gYDL3l0Sa2Y> for Part 1 <http://www.youtube.com/watch?v=dA4tGowO054> for Part 2.

More recently, at the end of October, there has been the Microwave Activity Day. A total of 15 stations are known to have been operating on 1296 MHz and above on the day. This is great considering that this was an event having no scoring of points associated with it – the activity was merely in order for radio amateurs to have some fun – sophisticated fun, for sure!

All six microwave amateur bands between 1296 and 24,048 MHz (inclusive) were used and station locations spread out from the greater Brisbane area to the Sunshine Coast in the North, the Border Ranges National Park close to the Qld-NSW border in Northern NSW, with Toowoomba and the Bunya Mountains to the West. A VK4GHZ video (like the others) should now be able to be downloaded at the VK4GHZ YouTube site.

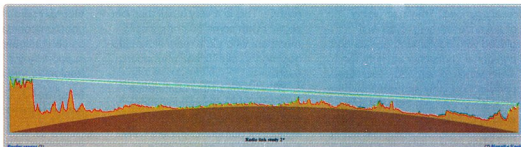


Figure 1: The profile for the 181 km path from the Border Ranges (VK4OE/2) to Howell's Knob in the Sunshine Coast Hinterland (VK4s WS UH & IIO with VK5s DK/4 NC/4 and EE/4). Graphic courtesy of VK4KJJ and VE2DBE's "Radio Mobile" software.

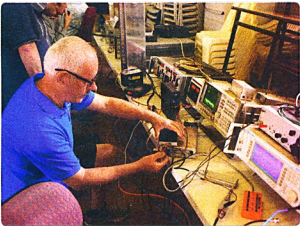


Photo 1: Colin VK5DK/4 operating on 24 GHz in QSO with VK4OE/2 181 km away.





Photo 2: VK4OE/2's view into the clouds at 1040 metres altitude. Direction is towards Sunshine Coast.



Photos 3 & 4: Two pictures of some serious microwave testing taken during September's Test and Tune-up Day. At the test benches are VK4ADC, VK4AQF and VK4CDI.

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5W	360	Natural white	Bayonet	SL-2212	\$14.95
5W	360	Natural white	Screw	SL-2213	\$14.95
10W	820	Warm white	Bayonet	SL-2214	\$29.95
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A real feature of the day's operating was the extension of two existing microwave distance records ('normal' not 'digital'). After some unsuccessful testing on 24 GHz between VK5DK/4 and VK4OE/2, contact was initially established on the 181.7 km path after Wayne VK4WS/4 arrived at the Sunshine Coast hinterland location called 'Howell's Knob'.



Photo 5: Roy VK4ZQ/4's 'loaded' mast partly elevated. Electrically-driven elevation and azimuth.



Photo 6: Adam VK4GHZ/4 set up for microwaves the side of Mt Mowbullin, Bunya Mountains.



Photo 7: Kevin VK4UH/4 operating with grid pack antenna on 2.4 GHz

After that, it was an easy thing for Colin VK5DK/4 to find the right frequency and bearing and to also join in on the new VK4 and VK2 distance record.

[Readers will be interested in the observation that a 600 mm diameter dish on 24 GHz is extremely sharp to point and it is very easy to be nearly right but not to hear anything

until the pointing is precise]

The second record is the national mobile record for 3.4 GHz. Initially this was conducted very easily over exactly the same line-of-sight path as the 24 GHz record. After all other activity from Howell's Knob had ended (several microwavers in attendance!), Wayne drove a few kilometres to the North to a look-out that was no longer line-of sight. Signals on 3.4 GHz were dramatically attenuated but a contact was easily completed after Wayne moved his vehicle just a little. All very interesting and exciting!

So if you want to become involved in some immensely satisfying new area of amateur radio, the area of microwaves that's reported here could well be what you're looking for – give microwaves a go – you'll be so glad you did!



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# Adventures with a bistatic chirp and CW radar

Andrew Martin<sup>1</sup> VK3OE/VK3OER

## Introduction

Since the development of the chirp radar for amateur use was first reported on the VKLogger [1] in January 2010 together with the publication of the concept in DUBUS [2], many experiments and measurements using the SpectrumLab [3] software have been conducted to understand the capability of this radar. Some of these results were reported at the most recent GippsTech conference [4]. During this process some basic operating techniques have been developed to easily verify each measurement to be certain about what is being measured. Some surprising results have also emerged that show how capable is the chirp radar technique. These results could also serve as a basis for the revision of some Es theories, especially theories relating to long distance propagation on 50 MHz.

It has also been found that the combination of chirp and CW modes is very useful to ascertain the nature of the reflecting object. If the signal is returned from a stationary object, then of course it has no Doppler shift. But if the object is moving, the return signal will have a Doppler shift which, in chirp mode, will cause a range error. Objects such as aircraft have a very specific Doppler shift, while moving ionospheric irregularities can have a very wide range of Doppler shifts from one target. In these cases, the use of the chirp and CW modes is most helpful to ascertain the actual distance to the moving object.

During 2011, I developed a separate internet connected remote station (VK3OER), which is at a distance of 145 km from VK3OE. This station is very useful for receiving radar signals sent from VK3OE (in Bistatic Radar mode) and allows the received audio signals to be processed easily in real time.

The radar has been used on all the amateur bands from 14 MHz to 144 MHz to find out what can be achieved and what are the limitations. Most of the measurements have concentrated on the bands of 28 MHz and 50 MHz. 2 m has proved to be the most difficult band because there were only limited ducting opportunities available to test this band during the 2011-2012 summer ducting season.

The HPSDR group is developing the Hermes SDR transceiver with chirp mode built in, together with GPS timing and frequency control, which will enable direct and accurate measurement of distance to any chirp source or reflector. This development will significantly enhance the functionality of amateur chirp radars and

greatly assist in the more widespread application of the chirp radar capability [5, 6].

## Doppler Shift Errors and System Values

Doppler shift is of great concern when using the chirp radar as any Doppler shifted returns will be subject to a range error during processing. These range errors occur because any frequency shift of the return signal makes the return signal appear in a different place than where it actually is. This range error can be readily calculated. The Doppler shift,  $F_d$ , is given by:

$$F_d = 2vF/c \quad \text{Hz (1)}$$

where  $v$  is the velocity of the object (for radar, a receding object will produce a negative Doppler shift with respect to the transmitted signal),  $F$  is the transmit frequency and  $c$  is the speed of light. The Doppler shift is measured in CW mode.

The range error,  $Re$ , in seconds, when in chirp mode is then given by

$$Re = -F_d / (dF/dt) \quad \text{s (2)}$$

where  $dF/dt$  is the chirp rate in Hz per second.

The actual location of the object,  $Ra$ , with the measured Doppler shift is then given by

$$Ra = Rm - Re \quad \text{s (3)}$$

where  $Rm$  is the measured range (will be negative with respect to the direct signal if the Doppler shift is positive for a positive chirp rate  $dF/dt$ ).

As the output from the chirp radar mode is in seconds, the distance can be easily calculated by multiplying the time by 150,000 to get km in the backscatter mode and by 300,000 to get distance in the forward scatter mode.

Doppler shifted returns can look like static reflections in chirp mode and may be misinterpreted as they can appear in odd places, such as earlier than the direct signal. To resolve this, it is necessary to turn the radar to CW mode so that any Doppler shifted return signals can be identified and the Doppler shift measured. The actual range to the object can then be calculated from the above equations, allowing return signals to be correctly located and identified.

The system gain,  $G_s$ , can be calculated from:

$$G_s = TXp + TXant + RXant - RXsen \quad \text{dB (4)}$$

where  $TXp$  is the transmit power,  $TXant$  is the transmit antenna gain in dBi (cable losses included),  $RXant$



is the receiver antenna gain in dBi and  $RX_{sen}$  is the noise power of the receiver in a 2 kHz bandwidth when connected to an antenna.  $TX_p$  and  $RX_{sen}$  are normally expressed in dBm.

The complex receiver chirp processing gain,  $G_p$ , is given by:

$$G_p = 10 * \log(BT) + 3 + 10 * \log(Nchirp) \quad \text{dB (5)}$$

where  $B$  is the chirp bandwidth,  $T$  is the length of the chirp and  $Nchirp$  is the number of chirps averaged.

The chirp radar system gain,  $G_c$ , is then given by:

$$G_c = G_s + G_p \quad \text{dB (6)}$$

The path loss,  $Pl$ , in radar mode can be estimated from:

$$Pl = G_c - S / N_c \quad \text{dB (7)}$$

where  $S/N_c$  is the signal to noise ratio of the received chirp.

The estimated S/N for a one way contact is:

$$S / N = G_s - P_e \quad \text{dB (8)}$$

where  $P_e$  is the estimated one way path loss given by:

$$P_e = 20 * \log(d) + 20 * \log(f) - 147.55 + Esl + Rd \quad \text{dB (9)}$$

where  $d$  is the distance in metres,  $f$  is the frequency in Hz,  $Esl$  is the  $E_s$  layer reflection loss and  $Rd$  is the D layer absorption loss, which applies for each D layer transit in daylight. The  $E_s$  reflection loss for each reflection is assumed to be around 2 dB on 28 MHz and 50 MHz, while the D layer absorption loss is assumed to be around 1.5 dB at 28 MHz and 3 dB on 50 MHz for each D layer transit. The earth surface reflection loss is assumed to be close to 0 dB.

For all the 50 MHz radar measurements,  $TX_{ant} = 12$  dBi Yagi @ 25 m with  $TX_p = 50$  watts. The receive antenna is 145 km away, and  $RX_{ant} = 12$  dBi Yagi @ 8 m. Assuming an  $RX_{sen}$  level of -129 dBm in a 2 kHz bandwidth (noise limited, not the receiver sensitivity), this gives a system gain  $G_s$  of 200 dB on 50 MHz. In chirp mode, a chirp from 500 Hz to 2500 Hz over one second is used, which, when averaged for ten seconds, gives a  $G_p$  of 46 dB. This is added to  $G_s$  to give a  $G_c$  of 246 dB on 50 MHz.

For the 28 MHz measurements,  $TX_{ant} = 8$  dBi Yagi @ 24 m with  $TX_p = 50$  watts. The receive antenna is 145 km away, and  $RX_{ant} = 4$  dBi Yagi @ 6 m. Assuming a  $RX_{sen}$  level of -121 dBm in a 2 kHz bandwidth, this gives a  $G_s$  of 180 dB. In chirp radar mode,  $G_p = 46$  dB is added to give a  $G_c = 226$  dB on 28 MHz.

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In backscatter mode, the backscatter coefficient,  $G_b$ , required from the backscatter object to obtain the measured  $S/N_c$ , is given by:

$$G_b = P I - 2 * P e \quad \text{dB (10)}$$

The backscatter coefficient was measured on 14 MHz using the chirp bistatic radar and found to be close to 43 dB at a distance of 1300 km. This value compares favourably with the maximum value of around 40 dB measured on 16 MHz at a distance of 1500 km by Steele [22]. This result gives considerable confidence that the measuring techniques used here are reasonable.

The backscatter coefficient,  $G_b$ , of an area can be estimated from

$$G_b = 20 * \log_{10}(4 * \pi * A_b * C_c / \lambda^2) \quad \text{dB (11)}$$

where  $A_b$  is the backscatter area and  $C_c$  is the correlation coefficient for the backscatter.

A very convenient program for generating chirp and CW signals is SpectrumLab [3]. It also has a built-in chirp receiver. In the case where better analysis of the received signals is required, the received audio chirp can be recorded by SpectrumLab and then analysed in Matlab®.

## Es Backscatter Measurements on 50 MHz

Backscatter measurements of Es using chirp and CW modes have been made on 28 MHz and 50 MHz. The 28 MHz measurements are relatively easier to make than measurements at 50 MHz because the probability of Es propagation at 28 MHz is higher than at 50 MHz. Further, it is often the case when using the radar at 50 MHz that no returns are received, even though there is 50 MHz propagation as evidenced by contacts. This is because of layer rippling and focusing [7], which is more evident at 50 MHz than at 28 MHz. The layer rippling and focusing often causes the remote receiver site to be in an Es "hole", especially when the radar transmitter is 145 km away.



Figure 1: 26 November 2011, open to WA on 50 MHz, VK Logger [8] showing spots and the location of the radar backscatter return, the radar reflection. Also shown is the chirp radar received data from the direction of 260 degrees using SpectrumLab. The noise level is about -55 dB.

Shown in Figure 1 is a radar result from the direction of 260 degrees on 50 MHz. The radar was first tried in the direct path to Perth at 275 degrees but no

backscatter return was received. The antennas were then turned further south and the maximum backscatter return was in the direction of 260 degrees. The direct signal is at 345 ms in Figure 1, with a chirp signal to noise ratio ( $S/N_c$ ) of 30 dB, which is treated as zero distance, while the backscatter return is between 4.5 ms and 10 ms later than the direct signal, with an  $S/N_c$  of about 27 dB. This gives a backscatter footprint of between 675 km and 1500 km in the direction of 260 degrees, as shown in Figure 1, and indicates that the backscatter signal is most probably from an Es layer and not from the F layer. By using equations 4 to 10 above, the sea surface gain required for this level of backscatter at 800 km can be calculated to be around 42 dB. The VKLogger radar spot [8] is also shown for the same time.

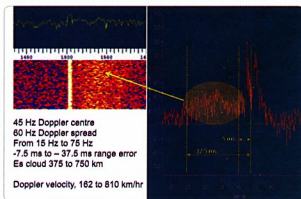
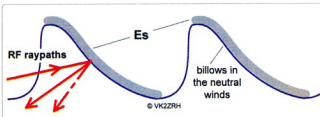


Figure 2: Measuring the Doppler shifted component of the return signal using SpectrumLab. The Doppler is centred at about +45 Hz from the direct signal with a spread of 60 Hz, from 15 Hz to 75 Hz. The direct signal with no Doppler shift is the bright line at 1505 Hz.

Also shown in Figure 1 is a spread out signal at up to 12 dB  $S/N_c$ , which appears before the direct signal. This is a Doppler shifted signal that is easily measured by changing the radar to CW mode. The result is shown in Figure 2. The direct signal with no Doppler shift is at 1505 Hz.

Using equation 1 gives the velocity of the backscatter object of between 162 km/hr and 810 km/hr. This velocity is close to typical wind speeds in the E layer and indicates that there is a large amount of turbulence and shear that is resulting in a backscatter signal from the Es layer. This backscatter is the mode often used for communication on 50 MHz and the Doppler shift causes the often reported distortion.

Equation 2 provides a range error value when the radar is used in chirp mode. This range error of between -37.5 ms and -7.5 ms can now be used in conjunction with equation 3 and the measured range of -32.5 ms and -5 ms to give actual ranges of 5 ms to 2.5 ms. This equates to the backscatter object being between 750 km and 225 km away. If these distances are doubled, we get distances of between 1500 km and 450 km, very close to the distances of the ground return footprint reported earlier. It is interesting to note that the highest Doppler frequency comes from the most distant part of the Es irregularity.



shown for a 30 minute period. The first record on the left shows a positive Doppler shift that evolves through zero to show a strong negative Doppler shift by record 4. At record 5, this has split into two, which is probably due to vortex-like structures induced by wind shear [11]. By record 6, the

Figure 2a: From [9]. Illustration of Kelvin-Helmholtz billows in Es at around 100 km altitude as an agent of back and side-scatter. The picture on the right is a visual indication of Kelvin-Helmholtz billows in the lower atmosphere, probably around 3 to 5 km altitude. This is the mechanism that produces the billows, crinkles, ripples or wrinkles in Es (as various authors have described).

The backscatter  $S/N_c$  from Figure 2 is about 12 dB at -18 ms from the direct signal. This part of the backscatter is about 500 km away. Using the above equations, we can calculate that the backscatter coefficient is around 17 dB to get the measured  $S/N_c$ . If it is assumed that the backscatter coefficient is around 0.01<sup>2</sup> for Es, then the backscatter object is about 10,000 m<sup>2</sup> in area (100 m x 100 m, equation 11) and seems reasonable, given a vertical wavelength of the Es ripples of about 2 km [21]. This is a rather different result for Es backscatter than for backscatter from the surface of the Earth, see later.

It is thus assumed that the Doppler backscatter is directly from the Es ripples; the mechanism is shown in Figure 2a [9, 10]. The picture (added by Harrison) is from Wikipedia Commons [10].

A further interesting issue is that the Es is south of the direct path to Perth for the contacts shown in Figure 1. This could indicate that the contacts were not made by the direct great circle path but by side-scatter from the Es by layer rippling [9] caused by the windshear at the height of the Es layer. This is further supported by the fact that the ground backscatter return is from a path further south than the direct path to Perth. The contacts to Perth shown in Figure 1 are probably via two hops via side-scatter from the irregularities in the Es layer.

This example has thus shown that backscatter with Doppler shift from Es is possible and that side-scatter from the Es ripples is also possible.

In Figure 3, recordings of using the radar in CW mode to measure the velocity of the Es ripples are

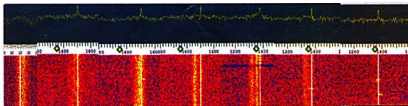


Figure 3: 26 November 2011, 260 degrees, 30 minutes of backscatter signals with 7 records showing Doppler shift measurement in 50 MHz CW radar mode. Records are 1 to 7 from the left. Recorded from 45 minutes after data of Figure 2. Direct signals with zero Doppler shift are the bright lines.

Doppler shifted signal is getting weaker, and by record 7 it has gone. This is explained as follows, from [11] "The Doppler width of the spectra is associated with the scatterers' velocity distribution inside the ionospheric volume illuminated by the radar beam. When turbulence is the main cause of backscatter, the spectral width gives an idea of the intensity of the turbulence." This is shown in Figure 4.

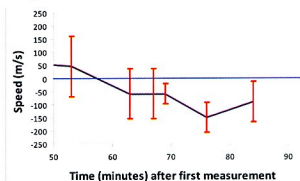


Figure 4: Doppler velocity evolution and spread from the backscatter 50 MHz CW measurements. Time is in minutes after first measurement of Figure 3 was taken.

In Figure 4, the maximum line of sight velocity is -150 m/s and is considerably higher than the velocities of 20 m/s reported in [11]. This probably because the measurement reported in [11] is from a vertically sounding (53 MHz) radar while the data of Figure 4 is from a horizontal measurement, probably indicating that the principal wind flow in the E layer is in the horizontal direction, producing higher line of sight Doppler shift. Speeds of up to 150 m/s were reported in [12].

The line of sight wind starts off towards the CW radar and then evolves to recede before disappearing. The measured speeds are probably the result of the crinkles moving in sheets of Es. Whitehead [13] states that "we may picture it as a fairly smooth horizontal sheet of ionization just a few kilometres thick, extending over 1000

km in horizontal size but with these slight ripples in it". When the signals are focused in particular directions with moving ripples, the result looks like moving clouds. This is discussed in [14, 20]. Kennedy and Zimmerman [14] state that "As the free electrons are dragged across the magnetic field, at roughly a 90° angle to the field, this produces a sideways electromagnetic force that bends the electron paths either upward or downward into orbits circling the field lines rather than continuing to move along with the wind."

Further, the width of the Doppler in Figure 4, of up to 70 m/s, is in the range of 20 to 150 m/s reported in [12]. As the width of the Doppler spread is related to turbulence, it is reasonable that the Doppler spread will be similar for a horizontal or vertical measurement.

Further results similar to those above were obtained on 18 and 21 January 2012, which served to confirm that the measurement results described above could be repeated.

### Es backscatter measurements on 28 MHz

The chirp radar measurement in Figure 5 shows Es backscatter returns obtained at an azimuth of 60 degrees out to a distance of 11,100 km. There are seven (7) distinct returns evident, indicating seven (7) hops. At the time of the measurement, there was a blanketing Es event on the Canberra and Sydney ionosondes, so no returns from the F layer are evident. The first two F layer hops' nulls would appear at around 3100 km and 6200 km. At both these locations, there is a clear return, which indicates that at these points, Es is involved. Further, all the hop distances are consistent with typical Es hop distances and are shown in Table 1. Because the average distances are shown in Table 1, it cannot be assumed that these are the distances of each hop. Indeed, it is most likely that multiple modes are occurring in hops 1 and 2 so that any assumptions about individual distances may be incorrect. It is also

obvious that the peak amplitude return for each hop is not at an exact multiple of any particular distance. If it is assumed that all hops have an equal distance of around 1500 km (10 ms) it is difficult to get a reasonable fit to match the distances shown for each return. There are also distinct nulls between each hop, reinforcing the fact that each radar return is a separate entity and that multiple backscatter signals are not overlapping, which would otherwise fill-in between each hop.

The signal returns out to 550 ms are all backscatter returns, so the distance is found by multiplying the time in ms from the direct signal by 150. The signal at 603 ms is a forward scatter result for once around the Earth, so the distance is obtained by multiplying the time in ms from the direct signal by 300. The signal at 603 ms in Figure 5 is from once around the earth and is probably achieved by mixed Es and F layer propagation with a dominant F layer guided mode; see the discussion later in this article.

Another interesting observation from Figure 5 is that between hops 1 and 2, the loss is very low. Further, there is a reduction in level between hops 2 and 3 of about 20 dB (10 dB in each direction), but after that there is only minimal loss between each hop for hops 3 to 7. The number of reflections for the 7<sup>th</sup> hop is a total of 14 Es reflections (out and back) and a total of 12 surface reflections. The return from each hop is by surface backscatter. The backscatter occurs only once for each return signal. The large number of out and back reflections illustrates that it may be possible to have 14 hops in a row, to over 20,000 km, it just needs the Es to be present as a sufficiently large horizontal sheet of ionization.

There will also be some signal attenuation in the D layer for each transit. At each reflection point, the loss is very low because of the almost grazing reflection angles [7, 15]. In order to make up the propagation loss from the radar over a distance of 22,000 km (which is twice the loss for 11,000 km) there needs to be some gain in the propagation path.

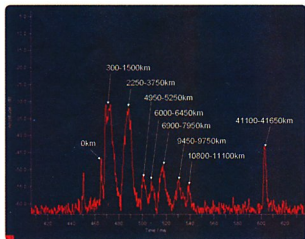


Figure 5: 28 MHz chirp backscatter measurement made @ 05:38UTC on 13 June 2012. The direction is 60 degrees. Distances are marked in km for each return, Zero distance is the direct signal. The signal at 450 ms arriving before the direct signal is a Doppler shifted return from an aircraft.

Hop	Distance of hop km	Time of day	Signal to Noise S/Nc
1	900	Day	35 dB
2	2100	Day	33 dB
3	2100	Evening	12 dB
4	1125	Night	10 dB
5	1227	Night	17 dB
6	2148	Night	10 dB
7	1350	Night	8 dB

Table 1: Hop distances for each of the 7 hops, together with S/Nc estimated from Figure 5. As the returns for the first two hops are spread, the hop distances are taken from the middle of each return for the first two hops and may not represent the actual path reflection point used to obtain the longer distance returns.



This probably occurs when the 10 m signal is backscattered from the sea surface at a low angle such as would be the case for Es originated signals. The backscatter surface needs to have scatters in the order of half a wavelength (5 m in this case) to be effective.

Hop	Calculated Path Loss	Measured Path Loss <i>Pi</i>	Backscatter coefficient required <i>Gb</i>
1	244 dB	191 dB	53 dB
2	268 dB	193 dB	75 dB
3	297 dB	214 dB	83 dB
4	305 dB	216 dB	89 dB
5	311 dB	209 dB	102 dB
6	318 dB	216 dB	102 dB
7	323 dB	218 dB	105 dB

*Table 2: The calculated radar path losses assume free space path loss. Loss is also added to each hop to account for D layer transits and reflection losses plus a step loss of 10 dB between hops 2 and 3 to account for the step loss in between those hops Figure 5. Each hop loss is then doubled to get the total radar loss. The measured loss is calculated by using the received S/Nc in Table 1 together with the system parameters outlined earlier. The extra backscatter coefficient, *Gb*, required to get the measured S/Nc is shown in the last column.*

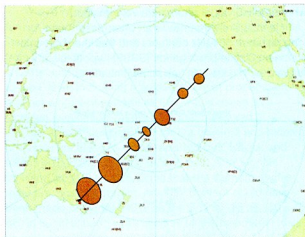
The backscatter surface gain, equation 11, can be applied to estimate the size of the surface needed to achieve the backscatter coefficients required in Table 2. If the backscatter correlation coefficient, *Cc* is 0.001 (see footnote 1, earlier), an area around 10,000 square km (100 km x 100 km) is sufficient to provide the required gains. As the sea surface is involved for every backscatter point, these values seem reasonable. The sea surface roughness will also affect the backscatter level. There is an increase in the backscatter coefficient with increasing distance which is probably related to the spread of the footprint at increasing distance.

At the time of the measurements shown in Figure 5, there were Es contacts on 50 MHz between VK3 and VK4 at levels up to S9. The one way path loss to the 1<sup>st</sup> hop is estimated to be 122 dB on 28 MHz (half the calculated path loss for the first hop in Table 2). If the system gain of 180 dB is used for a 2 kHz bandwidth, then the one way signal level on 28 MHz will be approximately S9 (S/N = 180 dB - 122 dB = 58 dB), which is similar to the 50 MHz one way signal level at the time.

The S/Nc from Table 1 to the 7<sup>th</sup> hop at 11,000 km is 8 dB, giving a measured radar path loss of 218 dB (equation 7). An estimated one way path loss of 161.5 dB (half the calculated path loss for the seventh hop in Table 2), provides the calculated overall radar path loss of 323 dB, requiring a backscatter coefficient (*Gb*) of 323 dB - 218 dB = 105 dB. Thus, the estimated S/N for a one way 28 MHz contact (neglecting the backscatter coefficient as it is not used for a one way contact) is *Gs* - 161.5 dB = 18.5 dB or close to S3 (assuming that the one way path loss estimate of 161.5 dB is correct).

The three longest hop distances shown in Table 2 are all over 2100 km. The fact that the hops are not all of equal length is attributed to the tilting and focusing that occurs due to wind shear and changes in the Es layer height over the 11,000 km path [7, 13].

From a conventional concept, for Es to support multi-hop propagation over 11,000 km suggests that seven Es "clouds" needed to be in exactly the right position at the right time. This is most unlikely and a better explanation may be that there was a wrinkled sheet of Es over the whole area ("crinkles, ripples or wrinkles" in the electron/ion sheet, as Prof. David Whitehead once put it [13]). As discussed earlier, the individual Es reflection points will then be controlled by the Es sheet height at each point, the nature of the "wrinkles" and the path geometry. As shown earlier in the section about Es 50 MHz, it is possible that Es side scatter is possible along the path so the results shown in Figure 5 may not be as a result of direct (great circle) path propagation.



*Figure 6: Location and approximate size of each of the Es hops in the direction of 60 degrees. The first four hops are before the equator crossing while there are three hops beyond the equator. The skip distances are typical of Es propagation and no F layer propagation is involved.*

The result of Figure 5 also shows that there is multi-hop long distance nEs propagation during the Southern winter solstice. It is thus likely that the same mechanism is present around the summer solstice when many contacts have been made between VK and North/South America in recent years. Many of these contacts were made when the sunspot numbers were very low.

Figure 6 shows the approximate locations of Es hop together with the approximate size of each backscatter return. The seven hops measured clearly have a path that crosses the Equator. This has not previously been thought to be possible as it had been assumed that the F layer was required for the Equatorial transit. This is clearly not the case as the hop distances are typical of those seen for Es propagation.

Further, Figure 7 shows multi-hop Es on 50 MHz, possibly out to a distance of more than 10,000 km. The bistatic chirp thus radar provides further evidence that nEs is indeed one of the long distance modes, this time also crossing the equator on 50 MHz. The S/Nc at 10,000 km is 15 dB, giving a measured radar path loss of 231 dB (equation 7). An estimated one way path loss of 154.5 dB provides an overall radar path loss of 309 dB, requiring a backscatter coefficient ( $G_b$ ) of 309 dB - 231 dB = 77 dB. Thus, the estimated S/N for a one way 50 MHz contact (neglecting the backscatter coefficient) is  $G_s - 154.5 \text{ dB} = 45.5 \text{ dB}$  or close to S7 (assuming that the one way path loss estimate is correct). By the same process, a one way contact on 50 MHz at 1100 km made at the same time as the measurement of Figure 7 would give S/N of around 64 dB or S9+15 dB. In Figure 7, the filling-in between the principal returns indicates that multiple propagation modes are present so that, after about 5000 km, the radar returns are completely smeared out. This is in contrast to the returns of Figure 5 where the individual returns are very distinct.

It is thus likely that nEs is an often-used mode for long distance 50 MHz contacts and that the short-path summer solstice propagation (SSSP) hypothesis put forward by Higasa [16] has some limitations.

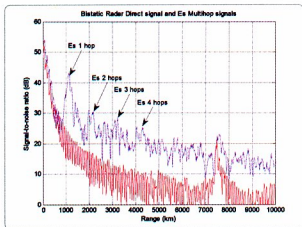


Figure 7: 0230 UTC on 22 January 2010 from a direction of 50 degrees. nEs measurement from [2] showing clear evidence of 4 Es hops. When the return signal is compared to the response with no signal (red) there is clear evidence of returns out to a distance of 10,000 km. The return at 7,600 km is an equipment spurious. After 1000 km there is a substantial amount of in-fill between each hop, indicating the presence of multiple propagation modes.

The nEs/SSSP is also discussed extensively by Harrison in [7] and he indicates that "To me, Higasa's hypothesis fails on too many key points. We know that the paths are not completed by F2 propagation or by tropospheric refraction/ducting. The remaining option is that SSSP propagation is supported by multi-hop Es (nEs, Figure 25). The next step is to find the evidence to match the

contacts." The nEs measurements shown in Figure 5 (28 MHz) and 7 (50 MHz) may indeed be the evidence that supports the nEs hypothesis put forward by Harrison in [7] and sought by Kennedy and Zimmerman [14]. If the 50 MHz long distance contacts reported were indeed by nEs, as this evidence suggests, then the concerns about distortion, excessive attenuation and scattering being limiting factors [14, 16] can be dismissed.

## Comparing 28 MHz and 50 MHz Es measurements

The question that arises from the 28 MHz measurements is: can the 28 MHz backscatter measurements be used for an indicator for 50 MHz propagation? To try to answer this, closely-spaced chirp radar measurements (one minute apart) were made on 28 and 50 MHz, the results of which are shown in Figure 8.

The return signals are very closely aligned, indicating that very similar results for Es reflections and surface backscatter can be obtained on 28 MHz and 50 MHz. This is very encouraging. The concept is that the 28 MHz chirp radar can be used as an indicator for 50 MHz propagation.

The 28 MHz signal in Figure 8 (top) appears at a slightly shorter distance than the 50 MHz signal (bottom) by about 150 km, indicating that the skip distance on 28 MHz is shorter than the skip distance on 50 MHz. The same effect could also be present in the result of Figure 5, resulting in a slightly longer range for 50 MHz than was measured at 28 MHz.

By using the point for maximum S/Nc of 1500 km for 28 MHz and 50 MHz, the required sea surface

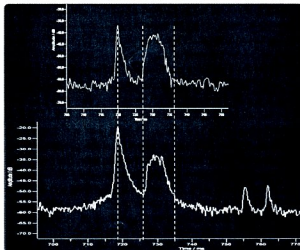


Figure 8: Closely spaced (1 minute) measurements using the chirp radar on 28 MHz, top, and 50 MHz, bottom, at 04:15 on 3rd July 2012. The two traces have been arranged so that the direct signals for each are in the same place and the time scales are the same. The first return in both pictures is Earth surface backscatter via an Es cloud at around 100 km altitude. The ground backscatter return is from between 1050 km with an angle of arrival of about 9 deg, and from 2450 km, with an angle of arrival close to 0 deg [9].

backscatter coefficient is estimated to be 56 dB for 28 MHz and 57 dB for 28 MHz. This represents an area of about 1 km wide and 75 km long (75 km is the minimum resolvable range), using the correlation coefficient of 0.001 as before. Contacts on 50 MHz at the time over the same path were producing S9 reports. A calculation using the measured results suggests S/N in 2 kHz of 62 dB, S9+10 dB.

The S/N on 50 MHz is around 27 dB, while the S/N on 28 MHz is around 22 dB. The two returns on 50 MHz at 765 and 762 ms are from aircraft, and appear to be at a great distance because of range errors due to Doppler shift.

### Around The World in 137.83 ms on 28 MHz

Figure 9 shows a 28 MHz chirp radar measurement out to a distance of 100,000 km. Three returns are evident, at 7000 km, 41,350 km (137.83 ms) and 82,700 km (275.66 ms =  $2 \times 137.83$  ms). Matlab® was used to obtain these values from the leading edge of the pulses. The first 'spike' is a first-hop surface backscatter via the F layer, while the second spike is a first around-the-world (ATW), and the third spike a second ATW. Such ATW signals were first measured by Hess in 1948 [17] where he reported a propagation time of 137.78 ms. Frequencies of between 10 and 20 MHz were used. The guided mode of F layer propagation is well described by Carera et al in 1970 [18]. The time measurements of first and second ATW signals shown in Figure 9 represent an error of 0.05 ms when compared to those of Hess, even

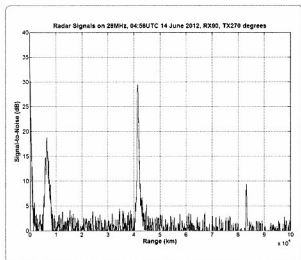


Figure 9: 28 MHz chirp radar measurements at 04:56 UTC on 14 June 2012. Transmitting at 270 degrees, receiving at 90 degrees. Signal processing gain is 46 dB, which would represent S/N of -16 dB in a 2 kHz bandwidth. X axis distance scale is 300 km/ms. The first around-the-world return has its leading edge at 41,350 km (137.83 ms) and the second around-the-world return has its leading edge at 82,700 km (275.66 ms). The signal at 7000 km is in fact a first hop Earth surface backscatter signal via the F layer at a distance of 3500 km.

though the measurement of Figure 9 is at 28 MHz. This indicates that the ATW propagation mechanisms on 10 to 20 MHz are the same as those on 28 MHz. Further, there is no Doppler shift on the ATW signal as there are no other significant signals anywhere near the ATW signal position that would indicate a range error induced Doppler shift.

The first and second ATW signals are about 300 km wide (at the -3 dB points following the leading edge of the signal), which indicates that there are some delayed components up to 1ms following along from the first signal (dispersion). By comparison, the direct signal at 0 km is only 75 km wide (at the -3dB points), which is at the limit of the resolution for a 2 kHz-wide chirp. The fact that the first and second ATW signals have the same amount of dispersion indicates that once established, the ATW signals are not further dispersed by additional, modes such as additional F-layer-to-surface hops. The direct result of this is that, once established in the F layer, the signals are guided by the F layer throughout the path.

The ATW signals travel from 1275 km to 1575 km further than the surface of the Earth, which represents an increase in the radius that the radio waves travel, ranging from 203 km to 250 km, at the height of the F layer. This is a further confirmation that the signals stay at or very close to the F layer indicating a guided mode of propagation and not a multi-hop mode as that would cause an increase in distance greater than that measured.

The azimuth angles used for the transmit and receive antennas are close to those reported by Fenwick and Villard [21]. The prediction of long path ATW signals by HamCap [19] also confirms that the azimuth angles used are close to correct. An ATW contact could have been made on 28 MHz CW as the S/N of -16 dB (30 - 46 dB) in a 2 kHz bandwidth is close to the minimum level useable for CW, for a 200 Hz bandwidth the S/N of the CW signal would be -6 dB: contact completed.

The result also indicates that ATW signals may also be present on 50 MHz and a measurement campaign is now in place to see if this can be achieved. If there is 40 dB extra loss on 50 MHz than on 28 MHz, then with  $2 \times 12$  dBi antennas and 100 watts, the chirp radar S/N should be around 5 dB, which is detectable. The next step would then be to make a 50 MHz CW contact using this mode to make the longest possible long path contact of 40075 km. Time will tell.

### Aurora backscatter measurements on 28 MHz

On the 29<sup>th</sup> of June 2012 I was looking for around the world signals when some extra returns were seen. The antennas were peaked on the signal at 220 degrees. There were three extra signals clearly evident in Figure 10, sea surface backscatter via Es at a distance of 1500 km, an auroral backscatter signal at a distance of 3900 km and a Doppler range shifted auroral signal a further 26 ms away.

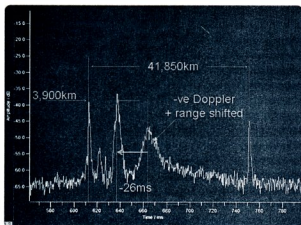


Figure 10: 28 MHz chirp backscatter radar measurements at 220 degrees, 04:40 UTC, 29 June 2012. The direct signal is at 612 ms. The signal at 622 ms is backscatter from the sea surface via Es at a distance of 1500 km. The signal at 638 ms is from the aurora at 3900 km. Signal at 664 ms is a Doppler shifted version of the signal at 638 ms. Signal at 752 ms is the first around the world at 41,850 km.

To verify what was happening, the radar was put into CW mode to measure the Doppler shift which is shown in Figure 11. The Doppler shift shown in Figure 11 can be used to calculate the range error of +26 ms on 28 MHz (a negative Doppler shift gives a positive range error). This shifts the Doppler signal back to exactly the position of the non-Doppler shifted backscatter signal thus verifying that the Doppler shifted signal results from the same area as the backscatter signal at 3900 km.

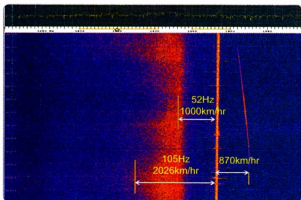


Figure 11: 28 MHz chirp backscatter radar measurements at 220 degrees, 04:40 UTC, 29 June 2012. Solar wind at the time was around 600 km/sec resulting in an unsettled geomagnetic field and associated extended auroral oval. The direct signal with no Doppler shift is shown as the bright line at 1485 Hz. The curved line to the right of the direct signal is an aircraft travelling at a maximum line of sight speed of 870 km/hr. The bright area to the left of the direct signal is the auroral Doppler shifted backscatter signal that has a line of sight velocity of between 1000 km/hr and 2026 km/hr.

The unsettled geomagnetic field at the time resulted in a strong movement of plasma away from the radar in the ionosphere which gives rise to the negative Doppler shift. Pointing the antennas further South resulted in a reduction of the radar return level from the auroral oval.

Strong, field aligned upward flow velocities of O<sup>+</sup> at times approaching horizontal velocities of 1 km/second (3600 km/hr) are frequently observed in the F region. There are indications in Figure 11 that velocities approaching 3000 km/hour could be present. The Super DARN radar was set up to measure the auroral effects seen here and a good source of information can be obtained from [23] as well as the many other readily available.

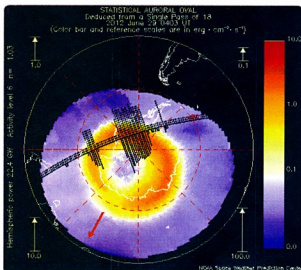


Figure 12: Satellite measurement of the Southern auroral oval at 04:03UTC, 29th June 2012. The positions of the Es return and the Auroral return in the direction of 220 degrees are shown.

To measure to a distance of 3900 km requires that the radar signal is refracted by the ionosphere as the reflection from the ionospheric plasma irregularities is at a height of around 200 km which is not sufficiently high to be visible by line of sight. This is probably the first time that amateur radar technology has been used to measure Doppler effects from the auroral oval. I have offered only a brief description of the effects being measured as the details are much more complex and are the subject of much on-going research.

## Conclusions

The chirp and CW radar has been used successfully in a number of modes to look at various propagation modes relating to Es and F layer propagation. For distances up to 11,000 km, nEs is shown to be a viable mode. It is also probable that nEs is responsible for many northern and southern hemisphere 50 MHz contacts. If this is the case, then the concerns about signal distortion and

excessive path loss with nEs propagation [14, 16] are unfounded. If the nEs mode is viable over the distances measured by the radar then it is entirely possible that the long distance VK/NA Winter/Summer solstice 50 MHz contacts are by nEs. It should thus be possible to make nEs contacts between VK and Europe on 50 MHz without the need to wait for the sun to deliver every 11 years.

It is also reasonable to assume that good radar returns on 28 MHz will indicate the possibility of 50 MHz nEs openings.

Around-the-world results on 28 MHz raise the possibility for investigating this mode on 50 MHz.

This work also shows that new discoveries and measurements can still be made by amateurs and that there are 50 MHz propagation opportunities still waiting to be explored. To take up these opportunities good antennas and higher power with common worldwide band plans would greatly assist especially given the propagation losses involved. It is also essential that the section of the 50 MHz band between 50.10 and 50.15 be kept entirely free from QRM caused by local VK/ZL Es contacts. This section of the band should be only for contacts between VK and the rest of the world.

### Acknowledgement

I wish to thank Roger Harrison VK2ZRH for critically reviewing this article as well as providing many of the very helpful references.

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### Endnotes

- 1 VK3OE@bigpond.com. Copyright A. Martin 2012.
- 2 I have not found any information on the backscatter correlation coefficients of the Es ripples or for the earth surface for the context in which it is applied here.



# Foundation Corner 21: Navigating the second hand VHF/UHF radio market

Ross Pittard VK3CE

For the newcomer to amateur radio buying a radio for the first time can be a daunting task particularly if you are on a budget and are looking in the second hand areas. A good place to start is your local radio club, as often other amateurs have unused gear for sale and the unit comes with plenty of instructions for the uninitiated. Other sources of pre loved gear are the local hamfests in all states, the regular disposal of deceased estates undertaken by ARVictoria and ARNSW; one major advantage here is that ARV and ARNSW test all their pre-loved gear before sale. *Amateur Radio* magazine still has the Hamads section near the back of the magazine, and there are occasionally bargains to be found there, but since the availability of the web most pre loved gear ends up on the VKHam website, and this site is probably the most popular web site for Australian amateurs looking for a bargain.

I am going to look at a few radios that often appear on the pre loved market, both ex commercial and amateur rigs. Remember as a Foundation callsign holder you are not allowed to modify radios, but most of the ex-commercial rigs will come already set-up for the amateur bands. The radios in this article are certainly not an exhaustive examination of what is available, but I hope it will give an idea of the type of gear that is around. An excellent place for information and basic functions of all amateur radios is the RigPix database, refer Reference 1; also many radios now have a dedicated Yahoo group with plenty of information, circuits and ideas from people who own these rigs.



Photo 1: Icom IC-22S

Before the introduction of VHF/UHF rigs by the Japanese amateur radio manufacturers in the early 1970s most amateurs either built or used ex commercial equipment at these frequencies. Once the big three manufacturers started selling VHF/UHF rigs it was quite fashionable to have an all mode VHF/UHF mains operated base station in the shack.

One of the most popular radios to come out in the early days was the Icom IC-22A VHF. This was a crystal locked radio with 22 available channels selected by a rotary switch on the front. It was replaced by the IC22S which had a diode matrix and frequency synthesiser replacing the crystals.



Photo 2: Yaesu FT-23R

Both of these can be picked up for a few dollars at hamfests but the 22A can be expensive for new crystals at around \$50 a pair (Tx and Rx) and the 22S can suffer from dry joints particularly around the diode matrix. Originally intended as a mobile, either radio makes an ideal economical shack radio.



Photo 3: Kenwood TR-2600A

These days it is probably better to concentrate on radios with a few memories so it is easier to program popular repeaters in your area. Some early offerings in the hand held category were the Icom IC-02E five watt VHF, the Yaesu FT-23R five watt VHF and the Kenwood TR-2600A 2.5 watt; all having ten memories and a VFO. They came out in the early eighties and are available regularly on the second hand market for around \$100 complete with antenna and charger. When looking at any of the early handhelds one of the most important considerations is the condition of the battery, as most used NiCd packs and they can be expensive to replace.



Photo 4: Yaesu FT-290

It is possible to obtain battery cases that use standard AA batteries for most of these radios but because of their age the cases are increasingly difficult to obtain. One can use either rechargeables or standard alkalines in these cases. Other accessories which came out at the time include desktop charging stands, external speaker/microphones, leather cases and larger battery packs.

Another series from the early eighties offered by Yaesu was the FT-690R/290R/790R.

As the model numbers suggest these rigs cover the 6 m/2 m/70 cm bands and have the added function of all mode capability. They are true portable radios with an inbuilt telescopic antenna, internal battery compartment, ten memories and the ability to be externally powered from an 8.5 volt to 15 volt source and deliver 2.5 watts. The 2 m version is by far the most common and expect to pay around \$150-\$200 for a good working unit.

Following on from these Yaesu produced the FT-680R/480R/780R series; again all were all mode

radios with four memories and 10 watt output.

These are considered to be base or mobile rigs and again the 2 m version is probably

the most common. Prices vary according to condition but expect to pay around \$200-\$250.

It is well worth investing in an all mode rig, even if your interest at the moment is only FM. An all mode radio can be useful in exploring satellites and also in contests as extra points are available for VHF/UHF long distance contacts. They are also handy if experimenting on the higher bands as an IF when used with up converters.

As well as the purpose built amateur rigs sold by the big three Japanese manufactures there are a number of ex commercial offerings readily available at hamfests and most will come already modified for the amateur bands.

While not offering all the bells and whistles of the dedicated amateur rigs they will perform well and in some respects outperform their amateur equivalents particularly in relation to pager overload. Here are a few of the more common commercial rigs found around the hamfests.



Photo 5: Yaesu FT-480R

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Photo 6: Philips FM92H

A regular seen on trash and treasure stalls is the Australian designed and built Philips FM92, part of the FM900 series; there were hundreds of these disposed of by the Victorian CFA amongst other organisations several years ago. They are fully synthesised and microprocessor controlled and the frequencies are programmed into an EPROM fitted to the radio base. They are available as a local or remote head version. Local head means the radio and controls are integrated in one unit whereas remote head means the control head is separated from the main body of the radio by an umbilical cable thus making it easier to mount in modern cars. Most offered for sale these days will be programmed with 99 channels on either the 2 m or 70 cm bands. Not all FM92s have CCTSS installed and as increasing numbers of amateur repeaters now use tones it would be advisable to try and find one with this function. Many older FM92s suffer from instability in the VFO, symptoms are varied but generally involve noise, crackling, micro-phony and in bad cases, the VCO dropping out



Photo 7: Motorola Syntrix

of lock. If possible, try before you buy, expect to pay anything from \$30 to \$100 for a good working one.

The AWA RT85 series is another locally made radio, there are a number of these around which are programmed on the

UHF amateur band and they should have CTCSS modules already fitted. They are probably not as common as the Philips offerings but are still a reliable rig. They are programmed by replacing the EPROM code with the desired amateur channels. Around \$50 should see one of these out.



Photo 8: Philips PRM80

The Motorola Syntrix series of radios were Australian made and came out during the mid-eighties through to the mid-nineties. These pop up on the second hand market regularly and come in both VHF and UHF versions. They have a remote handset which encompasses a channel changer, volume control and microphone. There are a number of amateur 'kits' around to provide EPROM upgrades to replace the original PROMs and this makes it easier to program amateur channels. A modified goer should be in the range of \$80 to \$120.

The Philips PRM80 series of radios have been around for some time but are newer and more versatile than the earlier FM900 and are available in both 2 m and 70 cm versions, with up to 99 channels available and they can also have a simple 'S' meter indicator, hi/

low power switch and channel banks programmed on the function keys on the radio front panel. Some variants come with a remote head easily extended with a Cat 5 patch lead. These radios have all their frequencies and operating parameters stored in EEPROM which can be reprogrammed via a small interface connected to the microphone plug. Software for programming these units is available on the web. Prices are generally in the \$80 to \$200 range for a converted radio on the amateur band.

The rougher the radios appearance is inversely related to its price; don't be afraid to ask questions and if possible see the rig

in action before you buy. Dealers at hamfests will be happy demonstrating rigs providing there is power available. If buying on the internet ask for some high resolution photos before committing and see if you can negotiate a dead on delivery (DOD) return deal that may save you some heartache if you

find the rig does not work when it arrives. Most hams should be happy to oblige with this arrangement. If buying an ex-commercial rig don't forget to ask for a channel list as most of these radios only have channel numbers.

I hope this article helps in navigating the second hand VHF/ UHF market and good hunting.

## Definitions

**PROM:** programmable read only memory, usually a one-time programmed device.

**EPROM:** erasable programmable read only memory, which are erased with ultraviolet light.

**EEPROM:** electrically erasable programmable read only memory, which are erased electrically.

## Reference

<http://www.rigpix.com/index.shtml>

# Amateur radio to the rescue

Brenton Meadows VK5BM

As a great number of amateurs around Australia have come to know, I am migrating to VK3, having purchased the property of my long term mate and fellow amateur radio operator, Mario Dolfen VK3NI. This has been no easy task with the enormous amount of logistics involved in transporting what has been a lifetime of collecting not only amateur radio hobby equipment but also over two tonne of XYL Samantha's scrap booking stocks. Whilst we are similar in nature and potentially should seek help in how not to hoard so much, we decided let's just do it and take as much stuff over, within reason.

So from an amateur radio point of view, this included nine rather large towers (two One Man Towers, three Nallys and four miscellaneous others), three large German engineered Optibeam, numerous VHF and UHF antennas and countless boxes of items incorporating 35 years of collecting amateur radio paraphernalia, and most definitely a ton of stuff that really should have been the subject of a massive garage sale.

So with the assistance of John VK5PO and Dale VK5FSCK we loaded two car trailers with numerous combinations of tower sections and antennas and copious amounts of Heliac and other coaxial cables that had collected over those 35 years.

With all the trailers strapped down and with a definite few tonne loaded on each of them, off we went. Now it should be pointed out that one of the trailers was brand new and was doing its first interstate trip; the other was a substantially older trailer that John VK5PO had his misgivings about from the start. I had borrowed the trailer from a contact of mine and by the time this story is finished, John's



Photo 1: John VK5PO – as always, quickly into action.

misgivings were shown as well founded. In regards to the trailer, I regrettably decided, in for a penny, in for a pound, and off we went.

The first obvious problem we had was that we had smoke pouring off the inside wall of one of the tyres; we corrected this on the side of the road with a spacer kit we manufactured.

So, thinking that we were well over any other problems, we set off for our 1000 km journey with radios on board and ready to DX while we travelled across the Riverland and then to northern Victoria. For quite a few hours, we conversed with loads of VKs all over Australia and we were all just having a great time knowing that in all probability, we would be into the VK3NI property in Tangambalanga around midnight, and able to unload in the morning.

Around 7.30 pm, we were around 75–80 km out of Mildura. Dale VK5FSCK and I noticed a slight problem happening that we alerted John VK5PO to on 7.073. The slight problem was that there

was smoke pouring off yet another tyre and we were compelling John on 40 metres to pull over. So now it is dark and we are assuming that we may need to set up some washer spacers once again to get us out of trouble.

No such luck. This time we had a completely collapsed bearing on the axle and it was all bad news. John VK5PO, who is incredibly mechanically minded said, 'mmmmm, Brenton, we are in quite a bit of trouble'. I'm not sure but his words may have been a little more explicit – hi hi. John also commented that we would need a bearing, as it's the only way we are going to get mobile. He was completely right.

Dale and I looked at each other and agreed we were really in some big trouble but John said 'OK, calm down boys, let's get on 40 metres and start checking our options'. Dale was also busy on his mobile trying everything he could.

This is where the spirit of amateur radio just gets incredible,



as 7073 kHz became the subject of an urgent situation and amateurs all over the east coast started discussing our options. Chris VK1GG, Peter VK2NEO and Steve VK3NF were all making phone calls to any possible providers of mechanical assistance for the next 60 minutes. Each of them was desperately searching for any way that any of the road assistance crowds could get us mobile.

Of course, it was now getting a bit later in the evening and somewhat colder and we were now starting to talk through our worst case scenario options, which included virtually needing to abandon the fully loaded broken down trailer. John VK5PO offered to stay and sleep in the car for the night until we could get back with a bearing but this was not a great option to leave him alone on the side of the road in the middle of nowhere.

Suddenly, Steve VK3NF became the start to what was the solution to the major part of our problems. Steve said, ring these guys, they are a bearing company in Mildura and they are going to open their doors as soon as you can get in there to make the bearings and repair bits available.

Then the story gets even more exciting as Colin VK3UBY who lives in Mildura comes up on air and says, 'Gentlemen, I will be meeting you at the bearing company and then we will be venturing to my home QTH to gather tools and then head back to John VK5PO and get this trailer back on the road'.

This was a 160 km round trip that Colin was suggesting on a cold Saturday night. What a guy, absolutely incredible in our minds.

We arrived at the bearing company where we could not stop thanking the young chap who interrupted his Saturday night to come into the store just to sell us some fairly low cost bearings. Colin VK3UBY knew exactly what we needed; it turns out he has built the



Photo 2: Colin VK5UBY saving the day!

odd trailer, actually it turned out he has quite an extensive workshop with quite a few classic cars and loves tinkering.

We arrived at Colin's house in Mildura and were greeted by Sandra, Colin's lovely wife, who we then find out is also VK3LSC. And then, we are treated to cups of tea and food, Sandra was just not letting us leave until she was certain we had at least had a little break.

What a great couple to meet. These guys then loaded up all their tools, jumped in their car and followed us back to the breakdown site.

Back at the breakdown site, Chris VK1GG and Steve VK3NF were ensuring John VK5PO was both safe and being continually updated with the activities back in Mildura and various ETAs back to the site of the broken down trailer.



Photo 3: Sandra VK3LSC instructing Colin VK5UBY on wheel bearing repairs. Hi.



We all arrived back around 9.30 pm and Colin got cracking getting our problem sorted. By 10.30 pm, we were back on the road.

We decided to put John into a motel in Mildura and Dale and I carried on through to Hay and crashed around 4 am at a motel who was kind enough to let us check in at such a late hour.

You wouldn't think there could be any other problems after all of this, and for Dale and I there was no issue: we arrived in Tangambalanga mid-morning and unloaded a few towers.

John VK5PO was quite a few hours behind us and around 2 pm, we looked across the roadway and there he was, driving in with the towers on board and getting closer by the second. Then Dale and I said to each other, 'Is there a missing wheel?' Sure enough, yet another wheel had let go on the trailer and it was gone miles down the Hume Highway never to be seen again. This time, it was the studs that had broken off; unreal bad luck.

Being a mechanically minded person, John thought that as he was only a few kilometres away from the final destination, he could strap the axle to the trailer and drive on at a very slow pace to get the load successfully to its final resting place. His quick thinking was a credit to his ingenuity but the trailer had proven itself to be totally inadequate for the journey.

Once we had unloaded, I announced to John that he could take my brand new trailer back and I will stick around an extra day and get the wreck of a trailer in for repair in Albury or Wodonga.

John intimidated the trailer should be driven off the nearest cliff. Hi...

We laugh about it all now but when we look back, what a horrendous journey with the mechanical nightmares we experienced.

However, the kindness shown by fellow amateurs is just hard to explain. It was a very emotional period when we considered the amount of amateur radio operators who took the time to care, to assist and to see us through to a successful conclusion. Special thanks must go to Colin VK3UBY and his lovely wife Sandra VK3LSC; these guys just are the most loving people on the planet; closely followed by Steve VK3NF, who was instrumental in the bearing supply; Chris VK1GG who made so many calls to so many possible suppliers and also would not leave his radio until he knew that John, Dale and I were safe.

I have now made six more trips covering over 12,000 km in the last month and with a few more, we will be finally settled in the most beautiful part of VK3 that I and Samantha have ever seen. We are already being made feel so welcome by quite a few amateurs from the Albury Wodonga Amateur Radio Club. Additionally, a special thanks to Rob VK5FRGM who also has been on numerous trips with me assisting with the move to VK3. Rob has decided to make the move to the Tangambalanga area as well, so there will be another VK5 coming to VK3. Once again, amateurs helping amateurs, it is a refreshing concept and an enjoyable reality based on our experience.

We love our hobby, we love the many facets that it offers, but essentially, John, Dale and I learnt that amateur radio operators are a group of people whose caring nature has touched our hearts. Thank you to everyone involved, the names mentioned above are only a few of those involved, the truth is there were many more, all trying to get us to safety. We will always remember the kindness of those who went the extra mile. Long live our great hobby and the fabulous people involved.

### Postscript

After submitting this story, Brenton VK5BM commented: *Hindsight is wonderful but the truth is I should have spent more time investigating the condition of the wheel bearings before such a long journey. Whilst we knew we were not overloaded as far as weight on the trailer, the condition of the trailer needed more inspection prior to any transporting regardless of distance. Lives apart from our own could have been endangered and my lack of mechanical knowledge is no excuse. Over \$800 of repairs were performed in Albury, NSW prior to me allowing this trailer to be put back on the road. The owner of the trailer back in Adelaide was grateful that the issues had been fixed and he even admitted he was unaware it had got to the stage of such ill condition. I suppose the moral of the story is safety first and double check everything before any journey, whether it be interstate or a few suburbs away.*



*The WIA office will be closed from 4:00pm Friday, 21st December @ will reopen 10:00am, Monday, 14th January, 2013.*

*Further details are available at our website [www.wia.org.au](http://www.wia.org.au)*

*The Wireless Institute of Australia extends to all radio-amateurs very best wishes for the festive season.*



# How I built a dummy load from commonly available components, and why I did it!

Neville Chivers VK2YO

I was in contact with a recently upgraded amateur on 40 metres. He had just purchased a new multi band transceiver without an internal tuner. He had been using an old five band transceiver and a trapped five band vertical with a well-known brand VSWR meter in line. When the coax from the vertical was connected directly to the new transceiver and the SWR read, it was higher than previously indicated with the SWR meter in line with the old transceiver. After careful checking the same result was again noted. Because his VSWR meter was an expensive one, he suspected his new transceiver was inaccurate in its display of VSWR.

I replied it was best not to jump to conclusions but to test the meter and transceiver individually on key down while connected to a 50 ohm non inductive dummy load. He replied that he did not have one and lived in an isolated location where help from another amateur was not readily possible.

On the next over I suggested he make one himself from commonly available parts. He did not seem keen on that idea, and replied that he may seek one in the 'Wanted' advertisements, and so the QSO ended.

On reflection I realised I had advocated a course of action I could not take myself, as I did not have the requisite dummy load either! But being a home brewer from way back I thought I should practice what I preach. So I did, and completed a very useful tool for the shack for about seven dollars.

To start with, I asked myself how hard would it be to source suitable carbon resistors to build a 50 ohm non inductive load? So, out with the Jaycar catalogue! I did not need a 100 watt dummy load, rather one of



Photo 1: The completed 20 watt dummy load.

about 10 to 20 watts, given almost all modern transceivers can be comfortably wound down in output to around five watts. As you only need enough output power to calibrate the meter to full scale, I figured 20 watts would be about ideal.

Consulting the Jaycar catalogue I noted the highest rated carbon resistors carried in stock were one watt, but not every preferred ohms value was available. However, one with 820 ohms at one watt was available, catalogue RR 2772, and 16 of these in parallel would work out to be approximately 51 ohms. These resistors were 5% tolerance, and the final measurement after construction was 52 ohms. A PL259 plug suitable for RG8U cable, Jaycar PP 0682 was also purchased.

To solidly mount these resistors in parallel and heat sink them, I selected a piece of 12 mm OD copper water pipe, 100 mm long, from the scrap metal tin and

flattened it with a hammer, where it finished up 20 mm wide. I then polished one side to a mirror finish and cut a piece 40 mm long off one end. On the longer 60 mm plate I cut two grooves length wise in one end, of about 5 mm each, to slide into the rear of the PL259 plug. I also had to file away the chrome plating on the plug to expose the brass, so that it could be soldered to the 60 mm copper plate at final assembly.

Next I came 5 mm along the 60 mm plate and clamped the 60 mm and 40 mm plates together in a vice and bored eight by two mm (8 x 2) holes, equally spaced along each side. I separated the two flat pieces of copper and threaded the 16 resistors through the holes from the dull side of the 60 mm plate, bent the resistor leads flat against the shiny copper face and flow soldered them to the copper. A high wattage soldering iron was needed for this. When all had cooled I slid the 40 mm plate over the other end of the resistors and repeated the flow solder process. When this had cooled I slid the PL259 plug onto the 60 mm bottom plate and soldered it in place. Lastly, I soldered an insulated wire from the centre spigot of the PL259 plug to the upper copper plate.

All finished, I screwed the dummy load to the SO239 on the back of my transceiver and set the power level on 40 metres to 20 watts, and the bar graph to read SWR. After one minute at 20 watts input to the dummy load it was noticeably warm, but there was no SWR reading registered on the bar graph at all.

Now, the next chore is to test my external in line SWR meters against themselves and the transceiver.

To be continued!



# Maryborough to host Australian Scout Jamboree AJ2013

Geoff Emery VK4ZPP



Figure 1: The official AJ2013 badge.

"This is one of the largest events to come to the Fraser Coast", said Geoff Emery VK4ZPP, President of the Maryborough Electronics and Radio Group. With an expected attendance of over 14,000 Scouts and Leaders, the Maryborough Showgrounds are being converted into an event village. Activities are for 10 days commencing on 2nd January 2013.

One area that is traditional to these Jamborees is the operation of an amateur radio station which both allows contact with the wider world to be made from the site and gives licensed amateurs the opportunity to operate from an unique event location. Application has been made for a special event call sign.

As many facets of the amateur hobby as can be accommodated are being followed through and invitations to the other regional clubs have gone out. It is hoped that apart from voice communications, using the standard Scout calling frequencies, there will be IRLP, Echolink, ATV through to fox hunting.

Site preparations have had to be undertaken whilst allowing the area to continue serving other

## World Scout Calling Frequencies

Band	SSB (phone)	CW (morse)
80 m	3.690 MHz	3.570 MHz
40 m	7.090 & 7.190 MHz	7.030 MHz
20 m	14.290 MHz	14.060 MHz
17 m	18.140 MHz	18.080 MHz
15 m	21.360 MHz	21.140 MHz
12 m	24.960 MHz	24.910 MHz
10 m	28.390 MHz	28.180 MHz
6 m	50.160 MHz	50.160 MHz

## Australian Scout Calling Frequencies

Band	SSB (phone)	CW (morse)
80 m	3.650 MHz	3.570 MHz
40 m	7.090 MHz	7.030 MHz
20 m	14.190 MHz	14.060 MHz
15 m	21.190 MHz	21.140 MHz
10 m	28.590 MHz	28.180 MHz
6 m	52.160 MHz	

local events and the concentrated effort of the AJ2013 team will be largely through December although commenced some months earlier.

For details of activities and general information on the Jamboree go to [www.aj2013.com.au/](http://www.aj2013.com.au/) or [aj2013.scouts.com.au/](http://aj2013.scouts.com.au/)

MERG, Inc is a WIA affiliated club and is helping coordinate the set-up and running of the event station. A full report will be published in *Amateur Radio* in the new year. Updates to the schedule will be provided to WIA News leading up to and including the Jamboree.

Contact details for MERG, Inc. can be found on the Wireless Institute of Australia web site under affiliated clubs. Alternatively email [vk4zpp@wia.org.au](mailto:vk4zpp@wia.org.au).



Figure 2: The badge adopted by the Victorian contingent.



Figure 3: The Queensland badge.

Christine Taylor VK5CTY

Held on the third Thursday in October each year, there were over 30 members and XYLs there, including Darcie Hancock at 102 years. Although you may only see people once a year, it is so good to be able to do so. Darcie was brought to the luncheon by Ian VK5IS along with the 20 metre transceiver Ian had built up from a kit. By a coincidence he sat beside Brian VK5NOS who knew him as a boy when he used to visit him in his shop for a chat whenever he had a chance. It is a small world.



Photo 2: Three 'Old Timers', Lloyd VK5BR, Ron VK5RV and Harry (Curly) VK5CL.

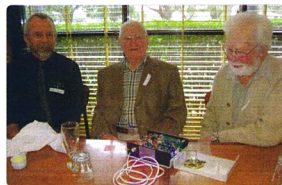


Photo 1: Ian VK5IS, Darcie and Brian VK5NOS, with Ian's kit transceiver on the table.

There were three ALARA YLs present too, to listen to Leigh VK5KLT talk about the vertical antenna he has designed and built on a high rise apartment in North Adelaide. Due to some fortuitous circumstances the antenna is almost invisible and it is almost noise-free despite being a vertical.

Ron VK5RV indicated that he would very much like someone to take over as President as he has many demands on him from his family. Please think about it.



## How a stray cat gave me some extra D-STAR contacts

Darren Glynn-Roe VK5DP

This is a true incident during the 2011 D-STAR QSO party that was held on the weekend of 11 to 14 November 2011.

I had been on the radio on Saturday and Sunday and made some contacts. I decided that if I was awake on the Monday morning I would try and make a few contacts to increase my score but if I was still asleep I would not worry about it.

As it happened I had a chair delivered on the Monday morning and my father arranged its final location. Having been woken up and asked if the location of the chair was OK, I said yes and decided to go back to sleep when out of the corner of my eye I saw a black horizontal line which looked like a tail of some sort. There was an

empty box in the living room and I heard scratching sounds coming from the box.

Having been fully woken up now I went to investigate this and to my absolute horror I saw a black cat playing in the box. It then proceeded to the vertical blind on the side window and started playing with it. The task now was to get rid of this uninvited guest and do it as quickly as possible. After opening the front door I noticed that the cat had ventured to the vertical blind on the front window and had started playing with it. Not knowing how to get rid of the cat gently I did the only thing I could. I hissed at it and the cat left faster than I could say CQ. I quickly shut the front door before the cat decided to come

back inside.

There was no way I could go back to sleep now, so with an hour to go in the D-STAR contest I turned on the IC-92AD to hear an Irish station calling. I acknowledged his call and another station from Ireland was calling. After answering these calls I heard a station calling me with a prefix that I had never worked since I had gained my licence. After exchanging numbers with him I looked up the prefix in the call book to find that he was from Argentina.

If the cat had not come in uninvited, I would have never made these extra contacts. This may be a strange way to get extra contacts but that is how it happened.



The September meeting was a construction night. A number of members made an amplifier using a valve, perhaps for the first time. For others it was a blast from the past! As usual Graham VK5ZFZ provided the instructions and the components for the project. By the end of the night some people had a working microphone amplifier on its own circuit board.

Graham also brought along a number of IF strips for people to remove the components from, to obtain the valve base. There was also a pin straightener in case they were a bit rough disassembling the board. Everyone was free to take home the components they removed to add to their box of useful bits!

The project was a simple utility amplifier that could be used as a microphone amplifier or for other purposes. It included a single 6AU6 (courtesy of the AHARS valve bank) as the gain stage, and for safety runs from a 12 V DC power supply.

The preamp is triode strapped and as the plate supply is only 12 V DC the anode current works out to around 100  $\mu$ A, zero grid bias needed to even achieve this low figure (plate starvation). Regardless

the voltage gain of the amplifier is still around 10 times, quite a respectable figure. The input impedance is just under a M $\Omega$  and the output impedance around 40 K. The plate supply is decoupled by R2 and C2, and ensures no ripple or noise on the anode supply line even with noisy plugpacks. The filament voltage is dropped from 12 V to 6.3 V with a series resistor R3.

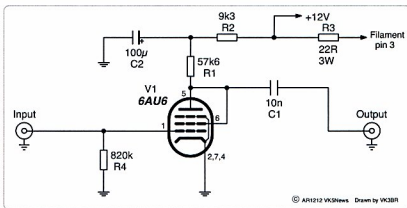
The whole amplifier was built on a folded steel chassis, the members having all of the fun using Q-Max punches to make the valve socket hole, and drill a few others (just for the experience). No specific component

layout was used as traditionally in most projects published in the 40s and 50s all you got was the circuit, leaving it up to your own ingenuity for the rest.

AHARS participated in JOTA at their 'shack' and were pleased with the day. The district Guide Leader was there to see what happens during JOTA.

By the time you read this the AHARS Buy and Sell will be over for another year and Christmas will be upon us.

On behalf of the committee and members of AHARS we wish you a 'Happy Christmas to all and to all a Good Night'.



The AHARS 2012 valve preamp circuit.

## The Westlakes Cup 2012

David Myers VK2RD - Contest Manager WARC

First Place Standard and Advanced Section:	Dr. Kevin Johnston VK4UH	23 points
First Place Foundation Section and 2 <sup>nd</sup> outright:	Richard Osborne OAM VK2FRKO	21 points
Equal 3 <sup>rd</sup> Place:	Vince Henderson VK7VH	18 points
Equal 3 <sup>rd</sup> Place:	Keith Turk VK2PKT	18 points

Only four logs from a participation of 11 stations is very disappointing. The committee have decided that next year we will start promoting the Westlakes Cup from around

April through various amateur media publications and news casts Australia wide.

Thanks to Vince VK7VH for the suggestions and the

encouragement to continue this sprint contest.

Thanks to those who took part.





# AMSAT

David Giles VK5DG

vk5dg@amsat.org

## A new BBS in space (sort of)

Apologies to those who are hoping for more digital BBS birds like UO-22. This month we look at the recent launch of some cubesats from the ISS, access to PRISM and the CAMSAT twins.

## Cubesats from ISS

After some delays the group of five 1U and 2U size cubesats taken to the ISS in July were tossed out using the robotic arm on the 55th anniversary of Sputnik (4th of October). One of the astronauts

took a picture of the second lot of three leaving the ISS [1].

WE-WISH was the first to go and was deployed by astronaut Akihiko Hoshide. WE-WISH has a telemetry downlink on 437.515 MHz and also transmits SSTV images taken with its infra-red camera (using the Scottie 1 format). Mineo Wakita JA9PEL describes how to interpret the SSTV images on his website [2].

TechEdSat from the San Jose State University in the USA is being used to demonstrate technology for

communication satellite networks. It transmits telemetry on 437.465 MHz using AX.25 every 30 seconds. The data and telemetry format details are available on the TechEdSat website as well as decoder software. Any packets received can be submitted to the website [3].

NanoRack/F-1 is a 1U cubesat developed by engineering students at the FPT University in Vietnam. F-1 is supposed to transmit telemetry frames on 437.485 MHz CW (but use FM to receive) while in sunlight and 145.980 MHz (1k2 AFSK every



## AMSAT-VK

### AMSAT Co-ordinator

Paul Paradigm VK2TXT

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### Group Moderator

Judy Williams VK2TJU

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### Website

www.amsat-vk.org

### Group site:

group.amsat-vk.org

## About AMSAT-VK

AMSAT-VK is a group of Australian amateur radio operators who share a common interest in building, launching and communicating with each other through non-commercial Amateur Radio satellites. Many of our members also have an interest in other space based communications, including listening to and communicating with the International Space Station,

Earth-Moon-Earth (EME), monitoring weather (WX) satellites and other spacecraft. AMSAT-VK is the primary point of contact for those interested in becoming involved in amateur radio satellite operations. If you are interested in learning more about satellite operations or just wish to become a member of AMSAT-Australia, please see our website.

## AMSAT-VK monthly net

### Australian National Satellite net

The net takes place on the second Tuesday of each month at 8.30 pm eastern time, that is 0930 Z or 1030 Z depending on daylight saving. The AMSAT-VK net has been running for many years with the aim of allowing amateur radio operators who are operating or have an interest in working in the satellite mode, to make contact with others in order to share their experiences and to catch up on pertinent news. The format also facilitates other aspects like making 'skeds' and for a general 'off-bird' chat. In addition to the EchoLink conference, the net will also be available via RF on the following repeaters and links.

### In New South Wales

VK2RMP Maddens Plains repeater: 146.850 MHz

VK2RIS Saddleback repeater: 146.975 MHz

VK2RBT Mt Boyne Repeater on 146.675 MHz

### In Queensland

VK4RIL Laidley repeater on 147.700 MHz

VK4RRF Redcliffe 146.925 MHz IRLP node 6404, EchoLink node 44666

### In South Australia

VK5TRM, Loxton on 147.125 MHz

VK5RSC, Mt Terrible on 439.825 MHz IRLP node 6278, Echolink node 399996

### In Tasmania

VK7RTV Gawler 6 m. Repeater 53.775 MHz

IRLP node 6124

VK7RTV Gawler 2 m. Repeater 146.775 MHz, IRLP node 6616

### In the Northern Territory

VK8MA Katherine 146.700 MHz FM

Operators may join the net via the above repeaters or by connecting to EchoLink on either the AMSAT-NA or VK3JED conferences. The net is also available via IRLP reflector number 9558. We are keen to have the net carried by other EchoLink or IRLP enabled repeaters and links in order to improve coverage. If you are interested in carrying our net on your system, please contact Paul via email. Frequencies and nodes can change without much notice. Details are put on the AMSAT-VK group site.

## Become involved

Amateur satellite operating is one of the most interesting and rewarding modes in our hobby. The birds are relatively easy to access and require very little hardware investment to get started. You can gain access to the FM 'repeaters in the sky' with just a dual band handheld operating on 2 m and 70 cm. These easy-to-use and popular FM satellites will give hams national communications and handheld access into New Zealand at various times through the day and night. Should you wish to join AMSAT-VK, details are available on the web site or sign-up at our group site as above. Membership is free and you will be made very welcome.

30 seconds) when eclipsed. So far no definite reception reports have been received by the engineering team.

FitSat-1 has probably been the most successful of the five. It transmits a loud CW beacon on 437.250 MHz as well as signals on 5.84 GHz and 474 THz (it uses LEDs). So far the 437 and 5840 MHz signals have been heard and it is expected to have the LEDs operational for Christmas. The website has details of the 5.84 GHz receiver at the ground station and pictures taken by the satellite as it left the ISS. Reception reports will earn a QSL card [4].

RAIKO doesn't have an amateur payload but will perform an experiment using Ku band microwave transmission. As I type it is three weeks since the launch and already the effects of the low orbit are being seen. From an initial altitude of 423 km they have dropped down to 410 to 418 km depending on the deployment. Due to their lower mass they are not expected to stay up there as long as ARISSat-1 did.

### Access to PRISM

Built by the University of Tokyo and launched in January 2009, PRISM is a microsat with a telephoto lens for taking high resolution images. PRISM has been running a CW beacon on 437.425 MHz continuously since launch, and will continue to do so. But there has been the hint that amateurs will be allowed access to the digital side of PRISM. A test was made during May 2011 but only now have details been released to amateurs worldwide. PRISM now has a small message board that will allow up to 98 small messages per week.

These messages are up to 39 bytes long. Details are on the website and there is some detail to go through [5]. The first page outlines the 'Ham radio service' function of PRISM. At the bottom of the page click on the 'Read The Terms' box to get to the page with all the conditions of use. If you agree to the conditions select 'Agree' at the bottom of the page (left side) and click on the 'Agree' button on the right and you will be directed to a third page that gives you the necessary details on how to access PRISM. Not in the same league as the UoSats but may be worth a try.

### Successors to HO-68

CAMSAT, makers of HO-68, have given more details of their new satellite project. Students at Qian Youth Space Academy are constructing twin satellites that will carry a comprehensive amateur payload. CAS-2A1 will have three beacons and three transponders. The beacons are all on two metres (CW, voice and AX.25), two mode U/V transponders (linear and APRS) and a mode L/S linear transponder. Its twin satellite CAS-2A2 has four beacons and a transponder. There are two beacons on 70 cm (CW and AX.25), and CW beacons on 2.4 GHz and 10.45 GHz. The linear transponder is a mode V/U. The satellites are planned to go in a 1000 km high sun synchronous orbit. The neat thing about these satellites is that they will be able to communicate with each other and extend the communications range. This would work like this: operator A uplinks to CAS-2A1 on 70 cm. The 2 m output is picked up by CAS-2A2 and transmitted down on 70 cm to operator B. Operator B then uplinks on 2 m to

CAS-2A2 which retransmits to 70 cm. This picked up by CAS-2A1 and retransmitted to operator A on 2 m. The distance between the two operators could be in the order of 10000 km, double that of one of the satellites. This all assumes the satellites are in range of each other and the operators can deal with four amounts of Doppler shift. There have been a few instances before with amateur satellites where it was possible to go through two at a time. The first example was back in the days of AO-6 and AO-7 where you could transmit on 70 cm to AO-7, then via the 2 m link to AO-6, then down on 10 m. But this was one way only. The CAMSATS should be able to have a two way conversation between them. As to how the problems with tracking two satellites and their transponders will be left to a later time.

### Final Pass

Occasionally even some of my predictions do come true and there is now a satellite using C-band (see this column in the September, 2010 issue). FITSAT-1's high speed data downlink has been heard on 5840 MHz by Japanese and US amateurs. Unfortunately for us FITSAT-1 uses a magnet to orientate itself and its C-band beacon will only be on over the northern hemisphere.

### References

1. [pic.twitter.com/wZX5qZL](http://pic.twitter.com/wZX5qZL)
2. <http://www.ne.jp/asahi/hamradio/je9pel/wishssste.htm>
3. <http://www.techedsat.com/>
4. <http://www.fit.ac.jp/~tanaka/fitsat.shtml>
5. <http://www.space.t.u-tokyo.ac.jp/prism/en/HAMservice.html>



**Participate**

**MIENA Hamfest Central  
Highlands ARC VK7**

**December 1, 2012**

**The Hills Amateur Radio Group V16AHR30**

**January 1-31, 2013**

# ALARA

Margaret Blight VK3FMAB – Publicity Officer

Another year is drawing to a close and once again we can only marvel at how quickly time has passed. There will no doubt be the last minute Christmas shopping and posting of Christmas cards still to be completed. If you are struggling for an idea for a present for that ham operator in your family, perhaps you could consider a subscription to his or her favourite radio magazine or even pay the annual radio club membership on their behalf. Nice and practical! You could even wrap up the receipt in colourful paper and tie with a ribbon. It will be much appreciated I am sure. Hi.

There have been a number of important events this year. We not only had the YL International Meet in Adelaide SA but also the WIA Annual Conference which was held in Mildura only a couple of weeks later. Both these events were well attended by ALARA members. In August the 32nd ALARA Contest was held and participants between them made 852 contacts. Contest Manager Lesley VK5LOL hopes to encourage even more participants next year. The ALARA Table was set up at a number of hamfests and continues the promotion of women radio operators to the general public. ALARA celebrated its birthday in July at a number of interstate events. Look forward to the 40th birthday celebrations in 2015. We are also looking forward to the YL MEET to be held in Port Stephens, Nelsons Bay, in 2014. Planning is already well underway in NSW. For further details see [www.alaramet2014.com](http://www.alaramet2014.com)

I wish all readers the compliments of the Season and better and better reception in the New Year.

## News from VK2

Dot VK2DB helped at the JOTA station at the Mt Colah Guides Hall.

The station callsign was VK2MA and the Guide leaders were keen to show how women are involved in amateur radio. The two stations, HF and VHF, were busy most of the time and the girls did very well using the mike.

Dot also gave a talk and film show about our International YL Meet to her local National Seniors Group



Photo 1: Dot VK2DB with Georgina on the mike.

who are always fascinated and interested to hear of radio related activities.

## News from VK4

Another resident of Sweers Island, YL and ALARA member Lee Davies, has also been active recently, with her own mini-pileup to Japan and the Canary Islands! Lee has been active for several years now as second operator, and has begun to study for her Foundation licence. Lee is already a competent CW operator, sending and receiving at 12 wpm, due to her own interest



Photo 2: Lee on CW.

in that mode. Who said CW was dead! She has carpal tunnel issues and has not been as active on CW this year, but recently she went on SSB with Col VK4CC and got her confidence back.

Lyn VK4SWE has also let us know of a young operator named Lily whose enthusiasm for radio is very encouraging. Lily is 13 years old. She hopes to fit in by applying for her Foundation licence soon, in between her schoolwork obligations. In her own words she outlines a recent experience.

## My first pileup

*I haven't been on the radio for over two years. I thought I would have*



Photo 3: Lily operating on SSB.

*forgotten all the signals, sayings and codes and would have made a fool of myself. When Lyn VK4SWE introduced me back to the radio we re-read over the phonetic alphabet, Q codes, RST reports and it all came running back to me.*

Lyn announced me in her daily ANZA DX Net where I was introduced as the second operator of VK4SWE. As soon as I had my chance on air and started talking I forgot about my nerves. I talked to some amazing and dedicated operators who were really encouraging me. Then came the pileup. I felt like a new toy. People from all around the world were trying to get a chance to talk to me. I had countries



Photo 4: Lily operating on CW.

like Italy, France, Wales, Netherlands, America, Japan, Germany and several islands around the world trying to catch a look at my amateur skills. Of course we tried talking to everyone and as time passed I grew more and more confident. We talked about the weather, personal details, time differences, holidays and thanks to Ben, my next holiday to Japan, where I will be staying with him.

I was having a ball and even though I spoke to over 50+ people I still wasn't bored. Things started to get out of hand because so many people were shouting out their partial call signs. We had to call it quits because we couldn't hear anyone except bits and pieces of callsigns. I never knew how many people use and operate radios and could talk to one another for hours on end. Definitely getting back on the radio was a great decision and I enjoyed it. I cannot wait to get back on the radio

and talk to many different people with the same interest.

73 for now, Lily.

### Feedback from operators

She was fantastic in that pileup! She was looking up calls on QRZ, logging RST on paper, checking a world map to see where new countries were – I just hope we can keep her interested, she is very bright and busy! Lyn VK4SWE.

Yes the best I've heard in a long, long time, and did I hear you say she knows Morse as well? If so that is just brilliant and yes I hope she keeps up with it not only because we need YL and XYL operators, because Lily seems right at home with it and I feel a lot of Russian, Italian and other countries could learn by her lead into the Code-of-Conduct on amateur Radio, Tell her I said so if you like as I feel she could be a great ambassador for Australia in amateur radio as well. VK2NRB.

Yes, Lily was very amazing, and I say again what a great radio presence! Keeping up with callsigns, names, and where folks are located in the world. A wonderful geography lesson! She would be a really great spokeswoman for the hobby. K5CX.

### News from VK5

Lesley VK5LOL and her OM, together with some other radio enthusiasts went to Kangaroo Island

for the ILLW lighthouse weekend. Despite a ferry crossing in very stormy weather everyone arrived safely and enjoyed their stay. After some manoeuvring with dipoles they obtained very good results. The ionospheric conditions were especially good on the Sunday afternoon and they even managed a pile up.

Shirley VK5YL would like to encourage YLs to come on the ALARA Net which takes place each Monday evening at 8.30 pm CST (9.00 pm during Daylight Savings Time) on 3.580 MHz.

### VK3 News

The final ALARA lunch for the year was held at Gisborne. Everyone present had an enjoyable day catching up with friends and participated in the exchange of a small gift to celebrate Christmas.

### Silent Key

We were saddened to hear that Valda Trenberth VK3DVT has become a SK. She held the post of ALARA's Treasurer from October 1981 to October 1986. Valda acted as Sponsorship Secretary, and Souvenir Custodian. She designed the ALARA Contest Certificate, notepaper, stickers and banner. ALARA extends our deepest sympathy to her family.



## DX-News & Views

Luke Steele VK3HJ & Chris Chapman VK3QB  
vk3hj@wia.org.au & vk3qb@wia.org.au

### October and November on the bands

The quiet solar conditions ended with a couple of M-class flares and an X-1.8 on 23 October. This resulted in a short wave fadeout about mid-afternoon local time.

That evening the higher bands ran hot, with European stations worked on 10 m fairly late into the evening, whereas they had usually been fading out after dark in VK3. A quick check of 12 and 15 m saw they were running well after midnight into

Europe. Geomagnetic conditions settled nicely, with decent solar numbers, just in time for the CQ Worldwide DX SSB contest, 27-28 October. Saturday evening was good on the high bands, and Sunday even better, with many

worked on 10 m from Asia and Europe. 15 and 20 m was still going flat out after midnight.

There was plenty of good DX, and many DXpeditions on offer during October. 3D2C Conway Reef was putting great signals into VK, along with T30PY Western Kiribati. ZD9UW Tristan da Cunha DXpedition was cut to one operator, Rob M0VFC, who was only able to operate for less than four days. TT9TT Chad made time to call for VK/ZL on 20 m. The Niger operation suffered fairly weak propagation in our direction, but a number of VK ops worked them. 3B9SP Rodrigues I seemed a bit easier to work, and were well heard on 40 m and up. XX9THX Macao also was not too difficult to work. OJ0R Market Reef came in well on the higher bands. Further north, JX9JKA Jan Mayen I has been workable on the higher bands in the late afternoon and evening. Svein LA9JKA is on Jan Mayen until March 2013, and may well be the last operator there for some time. At the other end of the world, Bob VP8LP Falkland I has been calling VK on 20 m SSB around 1030 UTC. 20 m has only been open to VK around October and November each year. Bob found an opening on the long path to south-eastern VK on 12 m 22 October. This was a surprise to Bob, who said he'd not worked VK on 12 m before.

The P29 IOTA expedition is in full swing, at the time of writing, with good signals on all bands. The Sable I activation by AA4VK and WA4DAN had to be cut short due to the approaching Hurricane Sandy, which affected almost the entire east coast of USA.

## Some Upcoming DX Operations

The following table summarises some of the DX activations that may be of interest to VK operators.

ZL9HR, **Campbell I**. This operation should be on air around the time this AR reaches your mailbox. Have fun working a rare "local" entity. Signals should be

Date	Call	QSL via	Info
- 3 Dec	VP2V	LotW	British Virgin I, NA-023, N3DXX, AA7V. QSL also ok via NR6M direct.
- 3 Dec	7P8D	LotW	Lesotho, 160-6m.
- 8 Dec	E51TLA	LotW or OZ6TL	South Cook, Rarotonga I, OC-013, OZ6TL, CW, RTTY.
- 9 Dec	ZL9HR	LotW or EB7DX	Auckland & Campbell I, <a href="http://www.campbell2012.com/">http://www.campbell2012.com/</a>
- 10 Dec	5T0SP	LotW	Mauritania, Polish DXpedition, 160-10m
- 15 Dec	5H3NP	WB0VGI	Tanzania, Noel WB0VGI, 30-10m, CW/SSB/PSK
- 11 Dec	C6	Home Call	Freeport, Bahamas, NA-080. N4BP as C6AKQ, N4UM as C6ARU, K4RUM as C6AUM.
- late Dec	CY0/VE1AWW	VE1 Bureau	Sable I, NA-063. AI VE1AWW QRV till late December.
-11 Dec	8Q7AU	HB9OAU	North Male Atoll, Maayafushi I, AS-013, 80-10m; SSB.
1 Dec - 31 Jan	C6AGT	AK4BM	Bahamas, Green Turtle Cay, NA-080, 40-10m, SSB, Digital.
3 Dec - 12 Feb	EA8	Home Call	Canary I, AF-004, IK1PMR, PA3LEO.
5 - 12 Dec	V63XG	LotW	Micronesia, Yap I, OC-012, JA1XGI, 20-6m, mainly SSB.
7-11 Dec	C6AVA	N6AWD	Bahamas, NA-054, K6VVA, 40-17m, mainly CW.
10 - 13 Dec	JD1BLY	J15RPT	Ogasawara, Chichijima I, AS-031, J15RPT, 40-10m.
10 Dec - 5 Jan	E51E	EB7DX	South Cook I, Aitutaki I, OC-083, 5B4AIF, 40-10m, SSB, RTTY.
22 Dec - 07 Jan	H40FN	HA8DD	Temotu Province, Nendo I, OC-100, DK9FN, 160-6m, CW.
2013 5 - 18 Jan	6W7SK	LotW	Senegal, Saly Portudal, F6BLP, mainly CW.
12 - 20 Jan	ZF2PG	LotW	Grand Cayman I, NA-016, K8PGJ, 20, 15m, SSB.

strong all bands, and we should be able to beat the expected huge pileups from the Northern Hemisphere hordes!

VP2V, **British Virgin I**, NA-023. N3DXX, AA7V for CQ WW CW, and until 3 December.

7P8D, **Lesotho**. 160-10m, CW, SSB and RTTY. 3 stations 24/7, till 23 December. QSL via LotW or OQRS. See their website: <http://www.zs2dl.co.za/7P8D.html>

E51TLA, **South Cook I**, Rarotonga. Henrik OZ6TL will be operating again from Rarotonga, using CW and RTTY until 8 December.

5T0SP, **Mauritania**. Till 10 December. See the website for

further information. <http://5t0sp.dxing.pl/>

5H3NP, **Tanzania**. Look for Noel WB0VGI until 15 December. He plans to be operating from Iringa on 30-10 m using CW, SSB and PSK. QSL via home call.

E51E, **South Cook I**, Aitutaki I. Norman 5B4AIF will be operating from Tautu Village on 40-10 m, and maybe 80 m, 400 W, SSB and RTTY. He will be uploading to LotW and ClubLog. See [www.aitutaki2012.com](http://www.aitutaki2012.com) for more information.

C6, **Bahamas**. There are three Bahamas expeditions that will be active in December:

C6AKQ (N4BP), C6ARU (N4UM), C6AUM (K4RUM) will be



in Freeport, Grand Bahama until 11 December.

**C6AGT (AK4BM)** Robert will be operating from Green Turtle Cay on 40-10 m, SSB, and possibly PSK31, JT65, during his evenings. He may be operating QRP on 20 m from some of the nearby uninhabited islands. During his daytime, Robert plans to have a 10 m beacon operating, and SWL reports are welcome. He'll be there until the end of January.

**C6AVA (K6VVA)** Eric will be operating mainly CW from Berry I, 7-11 December. QSL only via N6AWD.

**CE0/VE1AWW, Sable I.** Al is expecting to be active from Sable I until late December. QSL via the VE1 Bureau.

**8Q7AU, Maldives.** Claudio

**HB9OAU** will be on holidays on Maayafushi I until 11 December.

Look for him on 80-10 m SSB.

**EA8, Canary I.** Andrea IK1PMR and Claudia PA3LEO will be operating from Canary I until 12 February. QSL to home calls, direct, via bureau or email request.

**V63XG, Micronesia.** Haru JA1XGI will be operating from Yap I 5-12 December. Look for him on 20-6 m, mostly CW but some SSB and digital. QSL via LotW, direct or JARL bureau.

**JD1BLY, Ogasawara I.** Mak JI5RPT will again be operating from Chichijima I 10-13 December. He will be active from 40-10 m, mainly CW, but some SSB, digital and satellite operations.

**H4QFN, Temotu.** Sigfried DK9FN will be returning to Lata

village, Temotu Province, Solomon I. He will alone this time, and will be operating CW, 160-6 m, 22 December - 7 January. QSL via HA8DD. Surplus funds from direct QSLs have been donated to the local hospital at Lata.

**6W7SK, Senegal.** Francis F6BLP will be operating from Saly Portudal, which is 80 km south of Dakar, on the coast. He will be there for two weeks from 18 January, operating 80-10 m, mainly CW. QSL via LotW, eQSL, direct or bureau.

**ZF2PG, Grand Cayman I.** Pete K8PGJ will be back in the Cayman Islands 12-20 January. He'll be Scuba Diving, and operating "Island Style" on 20-10 m. Radio activities will be during his mornings and early afternoons during the week.



# 2013 WIA AGM & Annual Conference

## FREMANTLE MAY 24-25-26 2013

The 2013 Conference will be held at the Tradewinds Hotel in historic Fremantle, Perth's port city. Fremantle is one of Perth's major tourist centres, offering history, culture and lifestyle.

Explore our convict past at the Fremantle Prison and the Roundhouse, be spoilt for choice of seafood feasts at the Fishing Boat Harbour, relax with a coffee on the famous cappuccino strip, or simply meander in the markets.

Visit the Maritime Museum on the harbour then wander around taking in the historic architecture and streetscapes, or simply take in a local brew at one of the many boutique breweries.

Just down the road you will visit the Wireless Hill historic communication site, formerly a coastal radio station, now home to a communications museum, the WA VHF Group amateur radio club and beautiful parkland with sweeping views of the city.

On Sunday evening there's a function at the Neil Penfold State Amateur Radio Centre, giving

you a chance to see this world class facility for yourself. The Northern Corridor Radio Group will host this social event.

Of course Western Australia has a lot more to offer than the few things you can do at a conference, so you'd do well to make the most of your trip to the West and stick around for some time after the conference to check out Western Australia, including Margaret River down south, the Kimberly up north and Ningaloo reef in the middle to name a few.

Airlines are offering very good fares across the country these days, and you'd do well to start watching their advertisements now to pick up some bargains, or better still subscribe to their email alerts to make sure that you discover the bargains first.

This conference is a collaboration of several clubs in Western Australia, and we look forward to welcoming you.

Complete details and registrations are available on the WIA website.





# VHF/UHF - An Expanding World

David Smith VK3HZ

[vk3hz@wia.org.au](mailto:vk3hz@wia.org.au)

## Weak Signal

On the morning of October 24th the bands opened to ZL from VK4 and VK2. Ross VK2DVZ was one of the first in, working Bob ZL3TY on 2 m at 2218Z. Bob enjoyed a number of other contacts into VK2 with signals peaking to 5x9. The opening continued that evening, again from Bob to VK2 stations.

The following morning the band opening had strengthened and Stephen ZL1TPH was now out portable in northern NZ. He reports: *Portable on Moirs Hill, I worked the following stations:*

144 MHz: VK2DVZ, VK2AMS, VK2BCC, VK2AWD, VK2AH, ZL2ARA, VK2ZT, VK2EI, VK2FRL, VK4JMC, VK4OX, VK4IBR  
432 MHz: VK2DVZ, VK2AMS, VK2AH, VK2BCC, VK2ZT  
1296 MHz: VK2DVZ, VK2AMS  
The highlight today was the 432 MHz contact up to VK4OX at 2317 km.

*This is the first time I have worked this band to VK4. The contact did not come easy and we both persevered for over half an hour waiting for a peak. We finally found that peak and it resulted in an easy SSB contact with chat included.*

*Equipment used:*

144 MHz: 200 W SSPA, TS-700a driver, ZL1RS two 5 element stack  
432 MHz 100 W Tono amp, FT-817ND driver, 14 element Yagi  
1296 MHz 150 W SSPA, 1296 MMT and Icom IC-202 driver, 1.1 m dish

On the following day, October 26th – activity across the water continued. Kevin VK4UH reports: *During a recent visit to the VK4UH QTH in Samford by the VK5 Mt Gambier 'team' (Colin VK5DK, Trevor VK5NC and Tom VK5EE), a short but intense Tropo opening to ZL1 occurred at around 0730Z on 26th October.*

*Although the Hepburn had been*

*looking promising from SE VK4 up the coast and across the Tasman, no beacons or stations had been heard all afternoon. As the sun was setting Brian ZL1AVS in RF73fd, operating from the shack of Steve ZL1AVZ in Auckland (2286 km) appeared out of the noise on 2 m SSB and was eventually worked at 5x1/5x5. Steve also came on the air and was worked by me and all the VK5 visitors. As conditions improved Steve and Brian were also worked on SSB on 70 cm peaking at 5x2/5x5. These were the first contacts to ZL for me from this new QTH on either band. I estimate the opening lasted no more than 45 minutes from this QTH and no beacons from ZL were audible at any time. Hopefully a sign of things to come later in this season.*

On the morning of October 27th the VK6 beacons made a brief appearance in VK3. At 2207Z, Jim VK3II reported hearing VK6REP near Esperance. A short time later, at 2225Z, Ian VK3AXH reported hearing VK6RST near Albany. No VK6 stations were heard.

## VK3 Microwave Test Day

After not-so-good weather forecasts, Sunday November 6th turned on ideal weather for the Test Day. The venue was the Eastern and Mountain District Radio Club rooms and the grass area at the rear was converted to a test range for the day, with a signal generator and remote-reading field strength meter about 54 m away. Eight people arrived with 10 GHz systems, three of them also with 24 GHz systems. As well, about 20 onlookers checked out the systems and also



Photo 1: ZL1TPH/p 2 m and 23 cm portable set-up.



Photo 2: Systems ready for testing.



Photo 3: (R-L) Rhett VK3GHZ, Rex VK7MO and Bryon VK3YFL behind Rex's new 50 W 10 GHz system.

brought along other bits and pieces for show.

On the whole, most systems seemed to be working OK but some improvements were identified. Ian VK3AXH was one of the stand-outs, taking top spot in the normalised performance stakes (that is, adjusted for dish size and output power) with his 10 GHz system that he had only completed days before and had not yet tested!

Jack VK3WWW was about with his video camera and filmed a short piece on the day. You can find it at <http://www.youtube.com/watch?v=b9u01vPMmCU>

Thanks to the EMDRC for providing the venue and lunchtime BBQ.

## VK4 Microwave Activity Day

Following their very successful Test Day, the VK4 microwave community held an Activity Day on October 28th. Unfortunately, the weather was a little inclement in some areas but, nevertheless, about 12 stations participated including Colin VK5DK/p. Adam VK4GHZ has again put together an excellent video of the day; it can be found at <http://www.youtube.com/watch?v=0DgF6Fun-qU>

## VHF/UHF Field Day Scoring

The responses to the survey on the Field Day scoring have been collated and a report produced by Andrew VK1DA.

In summary, a majority of respondents support the proposal, with 79 in favour, 24 partly in favour and 13 against. In addition there was widespread approval for the concept of a separate category for the 6 m/2 m/70 cm bands. This category could be further expanded to include the 23 cm band, but still



Photo 4: Peter VK3APW with his 24 GHz and 10 GHz setups.

providing for a 6/2/70 subcategory. This would effectively split the event into the bottom four bands and the microwave bands.

A number of other changes are proposed. The full 55-page report can be found at [http://vk1da.net/VHF\\_report\\_final.pdf](http://vk1da.net/VHF_report_final.pdf)

Please send any Weak Signal reports to David VK3HZ at [vk3hz@wia.org.au](mailto:vk3hz@wia.org.au)



## Digital DX Modes

Rex Moncur  
VK7MO

### More tropo-extension of Meteor Scatter

On 20 October Starr ZL3CU reported his first ever Meteor scatter ping from the Australian mainland, from Ross VK2DVZ, over 2179 km as follows:

185430 6.5 160 2 26 30,  
US\*L3TY/73 VK2DVZ IL

Starr was beaming at VK7 at the time so this ping from Ross was off the side of his beam. Starr is at

Christchurch on the South Island and beams over New Zealand's Southern Alps, which would normally cut off long distance and thus low elevation meteor scatter signals. At the same time Simon ZL4PLM near Christchurch and Ross VK2DVZ reported seeing pings from each other which they have rarely seen before. The Hepburn chart (Figure 1) shows the possibility of a tropo-extension out a few hundred km from VK2DVZ, which effectively shortens the meteor scatter path and increases the elevation to get over the Alps.

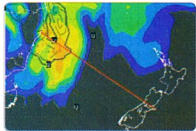


Figure 1: Path between VK2DVZ and ZL3CU.

### Aircraft Scatter on 10 GHz

Rhett VK3GHZ near Bairnsdale, Victoria has just completed his 10 GHz station using a 10 watt DB6NT amp and a 64 cm offset dish. It turns out that he has a reasonable take-off towards Rex

VK7MO in Hobart, Tasmania (561 km path) when Rhett operates from his carport and Rex can beam between trees towards Rhett and operate with his portable station from his lounge room. This has the advantage that both stations can remain set up out of the weather. It is found that there are a few aircraft flights each day that cross the path and also that weak tropo-scatter can often be seen as well over this 561 km path across the mountains of Tasmania. Initial aircraft scatter tests using JT65c produced decodes but the signals did not last long enough for a QSO. Accordingly ISCAT-A was used in 15 second periods and two QSOs completed – each on a single aircraft. Tests were also conducted using a tone from VK7MO with VK3GHZ recording the result on a wave file on Spectrum Lab. Figure 2 shows both the waterfall display as well as the amplitude display showing signal to noise in a 1.6 Hz bandwidth. The waterfall display shows the frequency with Doppler shift due to the aircraft movement and also a weak and spread tropo-scatter signal at about 1300 Hz. It is seen that at about the time the aircraft scatter signal crosses the tropo-scatter, indicating zero Doppler and the crossing of the path of propagation, there is a very strong peak in the signal such that the noise background drops due to AGC action. The amplitude graph shows the signal to noise ratio peaked at over 40 dB at this time – but only for a second of so. There are, however, a number of peaks over 20 dB in 1.6 Hz bandwidth which is equivalent to over -13 dB on the WSJT scale and sufficient for ISCAT-A. One might ask why the peak signal did not occur exactly at the time the Doppler was zero – we think the explanation may be that the Doppler has not only a horizontal component due to the aircraft crossing the path but also a small vertical component and this off-set is a result of the vertical component.



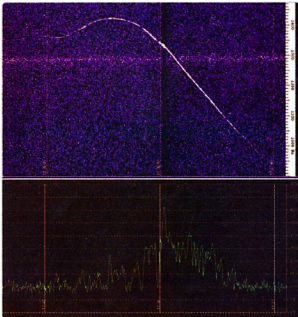


Figure 2: Aircraft scatter signal between VK7MO and VK3GHZ - the vertical white lines represent one minute.

### 10 GHz EME with 80 cm dish and JT65c

In DUBUS Volume 3/2012, it was reported that Rex VK7MO had worked Alan VK3XPD using his portable station comprising a 64 cm off-set dish and eight watts. This was achieved at a time of low libration spreading, down to four Hz, by using automatic Doppler correction and Deep Search averaging with Alan decoding Rex's signal at around -30 dB on the WSJT scale. Since then Rex has upgraded his portable station to a 77 cm dish and a 45 watt DB6NT PA; the result has been a dramatic improvement with Alan decoding Rex at -14 dB at a time of four Hz spreading. This is an improvement of around 16 dB of which 8 dB can be explained by the increase in power and 2 dB by the increase in dish size - but there is still an unexplained improvement of around 6 dB. With this new set up tests showed that Rex could now work Alan with libration spreading of up to 150 Hz, opening up many more opportunities for portable EME on 10 GHz. Tests were conducted with OK1KIR at a time of 30 Hz

spreading and with W5LUA at a time of 50 Hz spreading with good results. Rex then went portable to grid locator QE38 with Joe VK7JG and both completed QSOs with OK1KIR at a time of 70 Hz spreading. Further tests we conducted with OK1KIR and W5LUA to build up a picture of JT65c reported signal levels with spreading as shown in Figure 3. In general Deep Search decoding works effectively

down to -30 and often -31 and -32 dB on the WSJT scale with libration spreading of up to 150 Hz - with VK3XPD's three metre dish and 75 watts to the feed. Tests have still to be done with wider spreading, but Figure 3 suggests that the performance may only drop off marginally with spreading up to over 200 Hz as often occurs on 10 GHz. A question still to be resolved is whether the JT4G modes which are designed to cope with wide spreading will be better than JT65c. At this time there is a problem with the Doppler numbers on WSJT when using the JT4 modes, but

when this is resolved comparative tests will be undertaken.

### 10 GHz rain scatter?

On 23 October Rex VK7MO and Joe VK7JG set up Rex's eight watt 64 cm, and 45 watt 80 cm stations on Joe's lawn with the aim of doing comparison tests with Dave VK3HZ over a 440 km path. While no rain was evident at either end, or on the Bureau of Meteorology radar, signals to and from VK3HZ were quite distorted, but nevertheless JT65c and SSB contacts were completed. During these tests Rhett VK3GHZ called on SSB and was up to 5/4 even though he was 25 degrees away from the dish heading. When beaming direct to VK3GHZ signals were no stronger and still distorted. QSOs were also completed with Rod VK3BQJ on JT65c and SSB. Rod reported that the VK7 144 MHz and 432 MHz beacons were up over S9 and surmised that the propagation was due to a pre-frontal duct. However, the nature of the signals suggests that the propagation might be due to rain scatter from rain that is too light to be reported on the Bureau of Meteorology radar.

### 10 GHz tests between VK7JG and VK7MO

Over the period 24 to 27 October Joe VK7JG at Launceston conducted tests with Rex VK7MO in Hobart. This 200 km path is over mountains in central Tasmania and Joe cannot beam towards Rex because of rising ground and

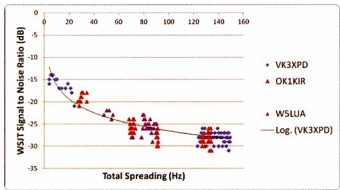


Figure 3: Observed libration spreading on 10 GHz EME paths.



Please send any Digital DX Modes reports to Rex VK7MO at [rmoncur@bigpond.net.au](mailto:rmoncur@bigpond.net.au)



## The Magic Band – 6m DX

Brian Cleland  
VK5BC

The sunspot cycle hasn't progressed as 6 m DXers would have liked and as a consequence October was disappointing. Most activity was in the northern areas of VK with almost daily openings to Japan and China areas with some openings to Hawaii. Highlight for the month was a contact by Norm VK7AC into the USA.

Norm reports that he was listening around 0245 UTC on the 15th October when he started hearing CW. Norm put out a CQ with several stations replying, which he soon read as USA stations. The strongest in the pile up was Terry N8RQG in Virginia, USA and a contact was completed over a distance of approximately 15,982 km. See the eQSL below.

Norm was running 400 W into a 5/8 vertical; his large 6 m Yagi is presently down due to Norm's activity on 10 m and has been replaced with a wide spaced 10 m 6-element Yagi. Terry's station operates on Solar/Wind power and he was only running 20 W into a very large antenna. Unfortunately no other stateside

contacts were completed but a little later Norm worked 15 x JA stations in all JA call areas. An interesting bystander to this activity was John VK7XX who, although hearing some of the stations on his 4-el quad, did not manage to complete a contact. 6 m in its usual way

produces the unexpected and again lives up to its Magic Band title, well done Norm.

Most days during the month there was normally some activity to the north from the northern areas of VK and on a few occasions the propagation extended south. One of these days was the afternoon of 10 October when conditions from Japan and China areas extend south to VK3 and 5. Many JAs including call areas JA1, 2, 3, 4, 6 and 7 along with LI BA4SI were worked by several stations including VK3s OER, OT, XDX and FI, VK5s GE, BC, DK and PO.

On 15 October, a JA opening again extended further south with Norm VK3DUT and Col VK5DK working several JAs and Bill VK5ACY heard his first DX for the season, the JA2IGY beacon.



Photo 6: Noel VK3FI in his shack.

24 October was also interesting with an Es opening from VK4 to VK5 in the morning with Brian VK5BC and Phil VK5RM working Brian VK4EK in Sapphire, Ray VK4BLK in Yepoon and Kevin VK4BKP in Mackay. In the afternoon the band opened from JA into VK4 with this opening extending down to VK3 and VK7 with some signals being heard in VK5. Frank VK7DX and Steve VK7CW worked several JA stations. The opening continued into the evening with Norm VK3DUT working LI BA4SI and several JAs.

During the month whilst holidaying in Mildura, I had a chance to visit and meet Noel



*Photo 5: The eQSL from N8RGQ*



Photo 7: The eight element six metre Yagi of Noel VK3FI.

VK3FI. Noel has a well-presented shack and is pictured below in his operating position: See Photo 6.

Noel has been a stalwart of the Mildura club for some time and following a hectic year with the running of the WIA AGM is now taking a back seat and renewing his interest in 6 m. As reported above Noel managed to work JA on 10 October. Noel's 6 m setup includes an 8 element ATN Yagi.

Back on 27 July I received a report from IW9HII who claimed to have heard me. Roger VK2ZRH has analysed the possibility of this report being creditable as follows:

### VK5BC 50 MHz to Sicily, an analysis

On 27 July 2012, Brian VK5BC enjoyed a fine winter afternoon on 6 m when the band opened over most of VK. Late in the day, Brian was surprised to receive an email from Davide IW9HII, in Sicily, who reported hearing his SSB signal at 0706 UTC, at 3/1 with QSB. Brian confirmed that he was calling CQ at the time, beaming northwest to VK6 as he had earlier copied the VK6RSX beacon at Dampier, at RST 559.

Brian posted a report to the VK Logger Forums (search 'Any Thoughts'), sparking some discussion. He remarked that the day '... was probably the best winter opening in VK5 this season with the band open to VK2, 3, 4, 6 and

7 over a couple hour period.'

Intrigued by the report, which, on the face of it I thought was credible, I embarked on an analysis of the probable propagation mode/s.

IW9HII is located in Marsala, right on the western tip of Sicily, at 37.810 N, 12.460 E (JM67FT). The path distance between VK5BC and IW9HII is 15,250 km, for which the 50 MHz free space

path loss is 150.1 dB [1].

Given that the northern hemisphere summer sporadic E season was in full swing, and the southern hemisphere minor winter sporadic E season was providing widespread 50 MHz DX on the day, it was obvious that Es was most

likely to be involved at each end of the path. It's the bit in between passing over the Indian Ocean, the Middle East and the Mediterranean that has to be figured out.

Figure 4 shows an azimuth-equidistant map of the VK5BC-IW9HII path, together with my analysis of the likely propagation modes. Local time across the map is shown by the arrows across the equatorial line. The heavy broken line running east-west is the geomagnetic dip equator, while the two light broken lines near the equatorial line indicate the limits of the daily equatorial sporadic E region. I have shown the locations of ionosondes at Learmonth, Cocos Island, Gibilmanna (on Sicily) and Guangzhou (China). I used data from these 'sondes to deduce characteristics of the likely propagation modes.

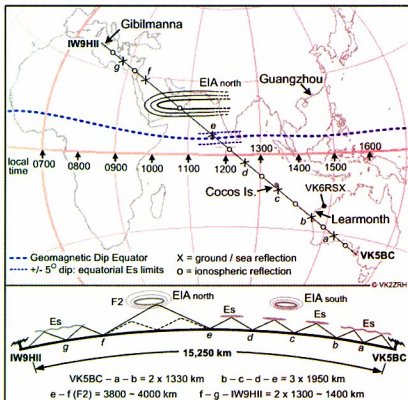


Figure 4: Map of the VK5BC-IW9HII path and, below, the vertical plane projection of the likely propagation modes (not to scale). The path may be designated as nEs-F-nEs. The equatorial ionospheric anomaly zones are indicated by EIA north and EIA south.

As it was most likely involved in this unusual event, the equatorial ionospheric anomaly (EIA) requires a quick explanation. Solar radiation causes plasma (ions and electrons) in the E and F regions over the geomagnetic equator to move up across the Earth's magnetic field lines, which are horizontal here. This sets up a complex process called the 'Fountain Effect', such that the plasma flows north and south along the magnetic field lines, accumulating into enormous 'bulges' in the F2 region that generally extend from about 10° to 30° geomagnetic latitude to the north and south of the geomagnetic equator. The anomaly zones enlarge and become denser as the day progresses and they move westward, following the Sun. The EIA dissipates after the Sun sets on the ionosphere. Around the equinoxes, the EIA bulges are pretty symmetrical, while around the solstices, they're not. In the northern summer, the northern EIA is large and dense, while the southern one is small and less dense; vice-versa in the southern summer.

The two EIA zones support daytime 6m chordal-hop transequatorial propagation (TEP), most often around the equinoxes, but also outside those seasons at times, depending on favourable solar and ionospheric conditions [2].

In Figure 4, I have sketched-in the 'leading edge' of the northern EIA. It would have passed over the Guangzhou 'sonde' some 3-4 hours earlier, so I looked at the data

published online. Sure enough, over 0700-0800 UTC, the F2 critical frequencies rose above 12.5 MHz, enough to support a skip of 3800-4000 km at 50 MHz [3] after 1030 LT when the path opened. So this sector of the path is highly likely to have been an F2 skip. However, 2-hop Es can't be entirely ruled out, as the northern hemisphere summer Es season was in full swing.

Between VK5BC and the equator, the Learmonth and Cocos Island 'sondes' both had spread-Es present, suggesting 'petit chordal hop' propagation [4]. Reception of the VK6RSX beacon 2660 km away indicated 2-hop Es of 1330 km per hop. From b to e, I deduced that Es of around 1950 km/hop (perhaps uneven hops) supported the path.

From landfall in the Middle East at f, it would have needed two Es hops of 1300-1400 km each. Interrogating the DXmaps 50 MHz database [5] over 0630-0910 UT showed that the propagation moved northwesterly, with skip distances ranging from 900-2300 km. If the Es was drifting northwest at speeds of 50-200 metres/sec, the ionograms would show Es with suitable characteristics would have moved between point g and Sicily some 2-3 hours earlier. Indeed it did, with Es drift speeds estimated at 110-125 m/s.

I did a rough estimate of VK5BC's signal strength at Sicily, using the method I have outlined on the VK Logger Forum [6], extending it for this exercise. Total path loss is roughly 178-180 dB, so VK5BC's

antenna gain and power output would yield a signal strength around -118 to -120 dBm, which is S1 in anybody's book.

Six metres is always full of surprises.

Roger Harrison VK2ZRH

## References

- [1] [www.siverson.com/rf-calculator/free-space-path-loss-calculator/](http://www.siverson.com/rf-calculator/free-space-path-loss-calculator/)
- [2] <http://home.iprimus.com.au/toddernslie/aTEP-Harrison.htm>
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- [4] Harrison, R. L. VK2ZRH 2012, 'On sporadic E VHF propagation and solving a mystery about maximum usable frequencies - Parts 1 and 2', Amateur Radio magazine, April and May.
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- [6] Harrison, R. 2012, 'Signal Strengths of VHF Sporadic E Propagation', at [www.vklogger.com/forum/viewtopic.php?f=43&and=10336](http://www.vklogger.com/forum/viewtopic.php?f=43&and=10336)

Thanks Roger, let's hope November produces some surprises and improved conditions.

Please send any 6 m information to Brian VK5BC at [briancleland@bigpond.com](mailto:briancleland@bigpond.com)

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## Season's Greetings to all

The office at 40g Victory Boulevard, Ashburton, which is ably run by a team of volunteers, will close at 1 pm on Tuesday 18 December and reopen on Tuesday, 5 February 2013.

During the break urgent matters will be given priority while office-bearers work on financial statements, stocktaking and the annual audit. The Annual General Meeting will be held at the office on Tuesday, 14 May, at 8 pm. Notices of motion for the AGM close with the Secretary on 12 February, at 2 pm.

On behalf of the Council – President Barry Robinson VK3PV, Secretary and Treasurer Ross Pittard VK3CE, Peter Mill VK3APO, Keith Proctor VK3FT, Terry Murphy VK3UP, Tony Hambling VK3VTH, Peter Cossins VK3BFG and myself, compliments of the season and best wishes for a Happy New Year.

## Centre Victoria RadioFest

While many of us take an annual break at this time of the year, the organisers of the Centre Victoria RadioFest No. 6 will be busy working on the big event. A feature

will be a homebrew competition with the primary judge to be Drew Diamond VK3XU, himself a noted homebrewer and author. Four radios have been obtained as competition prizes.

The event will be held at the Kyneton Racecourse on Sunday, 10 February 2013. The program is to be progressively promoted on the website <http://radiofest.amateurradio.com.au> It will have traditional commercial traders, second-hand gear sellers, club corner displays, a mini-lecture program, demonstration station and a homebrew competition. The non-commercial sellers can now purchase a trading space and hire trestle tables. This is through the new secure online bookshop which also includes log-books, callbooks and Foundation Licence manuals at <http://shop.amateurradio.com.au>

## Memberships and renewals

To join and support the state-wide organisation Amateur Radio Victoria costs \$30 for Full or Associate membership and \$25 Concession, for two years. That is less than five cents a day and your support through membership is most

welcome. You can now join online securely or send a downloadable form with the payment of your subscription to the office. Those who are already members with a current email address receive a renewal notice and may pay online or through the post. Access to the facilities on the members' section of the website and eNews bulletins cease after the announced cut-off date is exceeded. Thank you for your support by being a member.

The recent Council meeting of Amateur Radio Victoria expressed its thanks to the work done by our Internet Project Development Officer, Gary Furr VK3FX and the role of the Secretary, Ross Pittard VK3CE, in modernising the website facilities.

Council has also called for a greater involvement of ordinary members in the lead-up to the Centre Victoria RadioFest, the WIA Field Day public relations event, the International Lighthouse and Lightship Weekend, and throughout the year at HMAS Castlemaine, Williamstown.



## Over to you

### Fatal Foil

Dear Peter,

I certainly stirred up some amateurs with my story Fatal Foil. It NEVER happened. It is just a story to illustrate how easily electrical accidents can happen.

I was apprenticed to the electrical trade in January 1960. After 10 years of all kinds of electrical work, domestic, industrial, etc., I moved up a step becoming involved in Industrial Electronics. One interesting and amusing job was design and installing a device that looked for the hole

in the washer on a roofing nail making machine. You can imagine the mess when the machine tried to force the wire nail through a hole-less washer! All done with photocells and hard valves driving relays. With the introduction of the Licensing of Electrical workers in the 60s in SA, I am not sure when, I immediately obtained my "A" Class electrical licence, retaining my Radio Tradesman's qualifications.

I have now been retired for 15 years, after 25 years in TAFE SA and a previous 20 years in WRE, now DSTO.

I would have liked to have retained my "A" Class licence but the cost was too much, even the "B" class licence cost too much for a pensioner.

Over the years I have seen some atrocious electrical work and some I would be proud to say was mine.

Steve Mahony VK5AIM

"Close to 80 years!"







# Spotlight on SWLing

Robin L. Harwood VK7RH

✉ vk7rh@wia.org.au

2012 is almost over and what a year it has been! The decline of shortwave broadcasting did accelerate over this year and it will inevitably continue. The famous Radio Canada International transmitting complex in Sackville, New Brunswick is no longer there. The transmission lines were quickly dismantled and all the senders packed up, ready either for the scrap heap or to be disposed of commercially.

This year also saw the departure of the BBC World Service from the famous Bush House after 71 years. This building is quite near Australia House and many listeners have pleasant memories of programs from there. A new Broadcasting House has been constructed, adjoining the equally historic Portland Place site, home of the BBC Domestic services. However cutbacks continue as the funding for the BBC World Services is further reduced. 73 overseas reporters of the BBC were made redundant and I believe that shortwave delivery will probably disappear altogether by the middle of 2013. In fact I just received news that the BBC Cyprus relay is closing and BBC Arabic will be completely phased out by April of next year.

Radio Netherlands also disappeared this year and the new station supposedly set up in support of free speech also was shelved. Radio France International is still there but is often hit by wildcat strikes. Broadcasts are for Africa.

The RFI senders are still operational and mainly relaying Algerian domestic radio on shortwave. They are also used occasionally by Radio Taiwan International and NHK World for relaying programs into Western Europe.

DW in Cologne continues but from Kigali in Ruanda as they no longer use any European senders. Africa will continue relying on shortwave as Internet penetration is at a snail's pace. However the Chinese are continuing to utilise shortwave, despite entering into collaborative arrangements with domestic media throughout Africa and beyond. I believe that CRI can be heard 24/7 in the Dallas/Fort Worth metropolis in Texas over a domestic station but on a commercial arrangement as no foreign enterprise is allowed to own or operate a domestic American station. It is the same here in Australia but international programming is readily available on Australian media. CRI does broadcast via a low powered FM station 24/7 in Canberra.

Incidentally I was recently informed that the BBC World Service is carried 24/7 via SBS6 on its digital radio platform. This is only in mainland capitals and Newcastle. DAB+ has yet to make its appearance here in Tasmania. The BBC World Service is also on Foxtel on channel 23 on its radio fare. However the BBC World Service has just announced that English programming via the World

Service is being reduced even further to six hours a day. So much for 24/7 programming!

I am still plagued with my hearing hassle which apparently is caused by frequent excessive fluid build-up behind the eardrums. I have been prescribed nasal sprays and antihistamine medication but without success. I may not be able to hear music or conversations yet can still read CW at a certain pitch! One signal I was pleased to have heard was SAQ in Grimeton, Sweden. This is an AC alternator and was in use by the Swedish Navy from 1924 until the 1990s. It operates on 17.2 kHz and has now been designated as a heritage site by UNESCO. It is the one remaining operational AC alternator in existence. On 24 October it came on in celebration of United Nations Day from 1030 till 1040. The next scheduled transmission from SAQ will be on Christmas Eve, 24 December from 1030.

The power of the alternator is only 20 kW and there are Russian naval signals close by on 18.1 and 22.1. The latter are rated in the hundreds of kilowatts and mainly use digital traffic, compared to the CW of SAQ. Yes I did cheat as I heard them from an SDR receiver in Holland!

Well that is all for 2012 and let us hope that 2013 will be better. At least the higher frequencies are at last picking up.

73 and good monitoring from VK7RH!



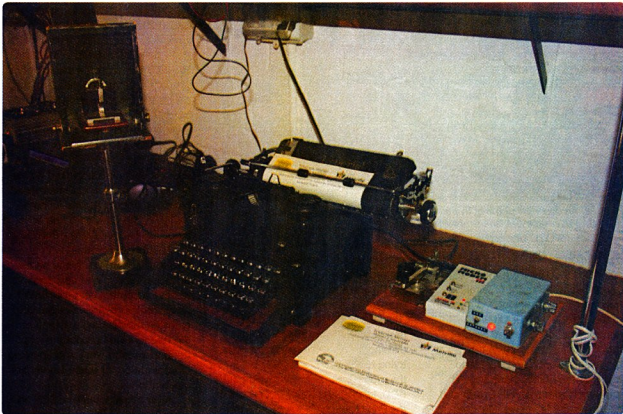
A **2013 Callbook** makes a great Christmas present.





# VK6news **Applecross Wireless Station Centenary**

Monique Faulkner VK6FMON



*Photo 1: Typewriter and speaker used by Morsecodians on the day of celebrations. Complete with special Centenary Telegraph paper.*

Applecross Wireless Station, now known as Wireless Hill Telecommunications Museum and Park, was built in 1912 with the construction of operations buildings completed, including Operators' House, Engine House, one small brick and tiled roof toilet at the north-east end of the site, a buggy shed and stables, a windmill and well, and circulating water tanks near the Engine Room. Along with those constructions, three residences and single men's quarters were built, and the most important, a 120 m mast erected behind the Operators' House, with three concrete anchor blocks, each approximately 4.6 m high, built to hold the mast guy wires.

During WWI, and then again during WWII, the Royal Australian Navy (RAN) took control of all coastal stations, including Applecross, as well as all wireless telegraphy in Australia, where they installed a 60 kW Polson Arc Transmitter and valve operated receivers to keep up the distant communications.

After WWI the AWA installed a short wave "Beam System", to extend the transmitting range of the station enabling direct communication between Australia and England, also becoming a direct feeder station for international radiograms, weather reports news bulletins and press reports.

Now for the celebrations part,

which brings us to the reason we are actually writing this article.

In 1955 the Western Australian VHF group was formed and they have as a group been going strong since this time to keep Wireless Hill on the map.

The special callsign of VI6VIP was in use from Wireless Hill to commemorate 100 years since it was first commissioned, from 29 September until 14 October 2012. VI6VIP was in recognition of the 1912 callsign used at Wireless Hill "VIP".

**On 30 September, Wireless Hill celebrated their 100 years of existence with "fairground" attractions. The Museum was officially reopened during this**



Photo 2: An overview of the activities occurring at Wireless Hill.

celebration encompassing an era in technology, from the earliest establishment of wireless telegraphy communications through to the introduction of satellite communication. The Eric Smith room of the Museum was the biggest attraction and the place to be. The Morsecodians shared the bench with the VHF Group and had the crowds in awe. Children and adults alike could not believe that these gentlemen were tapping away at this "stick on a block" and listening to 'clickedy clack' thru what would later be known as a 'speaker' which looked like a "sea shell" (as quoted by one young onlooker), which then formed the sentences that were being typed up on the old ~1930s typewriter.

Since Saturday 29 September, the VHF Group held the special event call sign of VI6VIP, communicating this to the whole world. Bob VK6KW and Ray VK6ZRW manned the station during the day. They were also lucky enough to have other fellow HAMS popping in to have a go at spreading the word of this special event, along with Heath VK6TWO, Monique VK6FMON, Miles VK6MAB, Marty VK6RC taking over the "nightshift" with lots of sugar to

keep us going into the early hours of the mornings.

On one such daytime occasion Graham VK6LV was left alone to "hold the fort" whilst Ray and Bob had quick duties to attend. Whilst utilising his spare time Graham was trying to fix his power supply but in the process accidentally tripping the RCD, leaving him sitting in the dark of the Eric Smith radio shack, no lights in the museum and shutting down all the BBQs in the park (not known at the time). Luckily enough Ray was not too far off, so these two gentlemen with lots of experience in "power" looked over the whole museum, inside and out, lifting up floor boards looking for this damn RCD switch... It wasn't until Terry VK6ZLT showed Bob, Ray and Graham that it was right in front their noses the whole time, low and behold it was a little button on the top of the power point about 30 cm from the main radios.

All of us had an amazing time, particularly with several hour long pileups to Europe on 10 m most evenings, making our total of contacts reached 1000+ to more than 70 countries in this short amount of time. The site was excellent for HF propagation thanks to all of excellent earthing and underground cables from the

former HF telecommunications site. So with this in mind we also participated in the Oceania DX competition from this site, having many a station try to contact us.

One specific contact made by Ray VK6ZRW was made with a QRP station from England using 9 watts. Peter G4VUN, was using an old TS-120V running off a car battery, with a 300 Ohm, 264' (80.5 m) top centre fed line. The excitement on his behalf was great and he mentioned that we were real DX for him. Wanting to make sure that he received the special QSL card, he sent his own card enclosed with a note of gratitude, a self-addressed envelope and an Aussie \$5 note. Receiving his QSL card was what made the two weeks worthwhile.

A surprising contact with a VK6er who was holidaying on the Solomon Islands and very excited to have a contact with the VI6VIP, as his partner (who was also enjoying her holiday) was one of the people who had done a lot of the background work and sourcing of information for these Centenary celebrations.

After a few hours of QSOs on one of the late nights we had a very strong signal with an uncommon to us call sign, but a strong Aussie accent, as we logged the call sign and realised it was Saudi Arabia, there were a few baffled looks around the room. To our surprise it was a local VK6er who works in Saudi Arabia and heard us calling, so was very honoured to make a contact with the VI6VIP.

There are plenty of other great stories and findings to tell you of, but unfortunately this article has to be cut short...

During this time our station (temporarily set up for this event using members' equipment) consisted of (but not limited to):

- \* **Antennas:** 8 el Log Periodic HF, Trapped long wire HF, 6 el 6 m Yagi, 2 x 13 el 70 cm Quagi with Az/EI Rotator (on a tilt over mast), 6 m/2 m/70 cm tri-band co-linear, KR-400 Rotator, KR-500 Rotator.



Photo 3: Wireless Hill Communication Museum as at present 2012.

- \* **Radios:** IC-756 PRO3, IC-7000, IC-718, FT-847 (Satellite), FT-817, Wouxun KG-920R, ID-1 23 cm D-STAR, IC-2820 D-STAR.
- \* **Accessories:** 2 x TransPower 45 A PSUs, HLA-150 300 W HF Amp, VLA-200 200 W VHF Amp, MFJ993B IntelliTuner, LDG AT-7000 Tuner, SP-102 DSP Speaker, ZLP DigiMasterPRO CAT/Digital interface, Motorola Zoom 10" Android Tablet, Dell Streak 7" Android Tablet, Samsung S9 Ultrabook.

Once again, thank you to the Melville City Council, the WA VHF Group, Bob VK6KW President, Terry Leitch VK6ZLT Secretary, Ray VK6ZRW Beacon Officer, Heath VK6TWO Vice President and Monique VK6FMON Food provider and QSO logger, for their efforts, long days/nights to make this event such a success.

For more of the history and information of the Site, the frequencies we worked and pictures can be found on [QRZ.com](http://QRZ.com).

Photos by Heath Walder VK6TWO. B&W and sepia photos courtesy of the WA State Library.



# Silent Key

## Thomas Raymond (Ray) Naughton VK3ATN

One of Australia's better known and well respected amateurs, Ray Naughton VK3ATN, passed away on 15 September, 2012, aged 83.

Ray was born on 4 February, 1929 in the Melbourne suburb of Ascot Vale, the only child of Thomas and Cissy May Naughton. He grew up living in a number of Melbourne's suburbs, one of which was Sunshine – his father was a fireman and moved about a bit during his career. Ray initially went to school at Camberwell, and later to Melbourne University High School; he was a good student and went on to study engineering at University of Melbourne. After the war, he re-entered the University at their Mildura campus, created to allow returned servicemen to further their university studies.

In 1952 he came to Birchip, as a part of his studies and worked there repairing radios. He could see the potential to earn a decent living in the town, and started Sun Radio – the 'Sun' coming from the suburb where he had once lived, Sunshine.

In 1956 Ray married Margaret, and they had three sons, Trevor, Peter, and David and a daughter, Jennifer, 12 grand-children and five great grand-children.

Ray had obtained his amateur radio licence, and the call VK3ATN, early in his life, and was to become the first southern hemisphere amateur, and one of the first in the world, to bounce a signal off the moon. This



great achievement was the result of a challenge from a number of American amateurs who doubted that it could be done from Australia, given the Australian amateur radio power limits, and with an antenna that pointed in a fixed direction. As a result, he was provided with an all-expenses paid trip to the USA to explain what he did in managing to succeed with this challenge.

He created ATN Antennas and produced and sold many fine antennas to both the amateur community and private and government enterprise.

Some lesser known loves were Australian Rules football, which he played with some skill, and membership of the Warracknabeal Aero Club holding, as he did, a private pilot's licence for some time. He also loved radio astronomy and 'studying the stars'.

In 1981 he had a very bad accident when a tower he was climbing came down in a mini tornado, and it was almost a year before he properly recovered. Then, in 1986 fire destroyed most of his factory, but son Peter, who worked in the business, was given the job of repairing the mess, which he did.

In 2011 Ray suffered a series of mini strokes and did not fully recover after that. At his passing he had been married to Margaret for fifty six years.

Submitted by his loving wife Margaret Naughton, and her family.



# Contests

Phil Smeaton VK4BAA  
e vk4baa@wia.org.au

Welcome to this month's Contest column.

## Oceania SSB and CW 2012

Once again, the bands came alive in VK with the world calling for a QSO. The bands were reportedly variable however, with 10 m either not opening at all or opening selectively to EU/NA sporadically – depending on the location of the reporter. At VK4KW, LF was not as good as the propagation forecasts had predicted, but this was further exacerbated by the strong winds causing static on the antenna systems. 80 m was unusable at times and 160 m was a joke. 40 m was fairly reasonable with some good openings present – and fully utilised by Laurie VK7ZX to create a splendid claimed total for himself of 5.4 million. Steve VK3TDX was active, claiming a score of 2.32 million points for just over 1,200 Qs. Steve also reported a variable 10 m band – it appears to be highly dependent upon the station location within VK as to the perceived usefulness of the higher bands. Mirek VK6DXI found almost 500 QSOs on 10 m, to add to his tally of 1,250 and a claimed score of 2.5 million points. Mirek reported that the first evening provided a nice run for few hours to EU on 10 m, but that EU was not strong but was a solid copy. Things were a bit slow during the second day, but he still managed to set his own personal best score for ODXC phone.

Matt VK2ACL and Patrick VK2PN were on the bands, gaining a claimed score of 10,440 and 108,745 respectively. Central Coast ARC was active as VK2AFY and claimed 19,700 points, while Paul VK5PAS netted 700+ QSOs for a claimed score of 587,000 points. Vlad VK2IM spent four hours scouring the bands for a

## Contest Calendar for December 2012 – January 2013

December	1	RTTY Melee	RTTY
	8/9	ARRL 10 m Contest	CW/SSB
	21/22	OK DX RTTY Contest	RTTY
January 2013		Ross Hull Memorial VHF Contest (VHF/UHF)	CW/SSB/FM
	12/13	Summer VHF/UHF Field Day (VHF/UHF)	CW/SSB/FM

claimed score of 160,000 points, and Catherine VK4GH worked over 700 stations for a claimed score of almost 750,000 points. Well done all!

## VK Contest Championship?

The VKCC reflector has been abuzz recently, with much discussion taking place around the hot topic of a VK Contest Championship. Certain contests would be nominated for participation, allowing a 'contest within a contest' type of approach to take place. The contributing contest might be VK based, WIA based, ARRL based, or a mixture of all sorts of contests from all around the globe. An eligible participant might have to enter a valid score for a selection of the listed contests, no less than a certain amount and no more than another amount possibly. On a world scale, contesting in VK is still small by comparison, so many may feel that a championship is neither required nor warranted. Some may say that this is the very reason to operate such a scheme! If it serves to promote VK contesting at home and overseas, then it seems like a reasonable thing to do. With the recent RD contest boasting over 1200 different call-signs in the logs in one 24 hour period, it could be reasonably argued that VK interest in contesting is increasing quite well. That's close to 10% of all licensed amateurs in VK entering the one contest. The award of Contester of the Year could be announced at the WIA AGM and the list of contests

will need to have results published prior to the end of April so that the award can be presented at the WIA AGM – always held in May. This would limit the list to finish with the Oceania DX Contest – although the JIDX usually has its results out early.

Structuring the proposed championship around WRTC might not be wholly applicable. I still find WRTC a tad strange and generally slanted by single operators often utilising larger stations to gain a top score and then having to abide by the WRTC rules and only have 100 watts and a limited selection of equipment for the actual final contest. This seems to me to be somewhat akin to qualifying for a Grand Prix race using highly tuned formula one cars and then running the final race in a horse and cart. Time will tell.

## Wanted: New WPX Contest Director

Randy Thompson K5ZD is moving on to take the helm of the CQWW contest and so the position of director of the WPX has become vacant. So, what does the CQ WPX Contest Director actually do?

Essentially, the role encompasses various responsibilities requiring the incumbent to:

- Communicate with participants to answer questions and help them enjoy the competition.
- Manage the log receiving and log checking process. Much of this is automated with behind

the scenes support from some true IT and programming experts.

- Recruit volunteers to help with each of the above. Not everyone speaks English so it helps to have friends and translators who can help bridge the communication gap. Many hands help make the log checking task easier.
- Work with W5GN and K1DG to make sure the certificates and plaques are distributed to those who earned them. This could be accomplished via email.
- Promote the contest in as many ways as possible. This includes fun things like posting information on Facebook, writing occasional blog postings, conducting a WWOF webinar, or writing articles.
- Curate the contest rules. Every year there is some new twist or gap that calls for changes.
- Maintain the integrity of the contest by evaluating suspect logs and deciding on appropriate actions such as Yellow and Red cards. Just like a referee on the field, you will be asked to call them as you see them.

### What skills are needed?

- Solid experience in all aspects of contesting. The more types of operating you have done, the easier it is to understand the needs and challenges of the participants.
- Enthusiasm and passion. There is no money in being a Contest Director. You do it because you love the game and you want to help others enjoy it as well.
- Computer and technology skills. You don't have to be a programmer, but it helps to be skilled at using various tools to make the job go faster. This includes everything from text editors to Excel to SSH and WinSCP. A bit of web editing experience is also very beneficial.

- Recruiting. There are lots of other testers who want to help. Every time Randy asked for help he often received more than one response to assist. Be willing to ask, but also be prepared with what you need done when the replies come.
- Organization and attention to detail. Avoid errors by keeping your team focused and following a process.
- Communication. The job is all about communicating with participants and conveying your passion for contesting through the write-ups and the web.

### How much time does this take?

The job can take as much or as little time as you'd want to give it. Expect to spend 10-20 hours per week between the middle of March before WPX SSB through early September when the WPX CW results are due to CQ Magazine (it doesn't have to be that much every week, this is just an average). The off season doesn't take much time at all other than answering questions and working on new ideas and the rules for the next year.

### Are you ready for the challenge?

The job does require a high level of proficiency in English to deal with the communications and writing required, but the WPX Director does not need to be located in the USA. Most of the WPX Contest activity is located in Europe – so I dare say that an applicant from VK might not get much of a look in! Drop CQ a note if you feel otherwise though – unless the position has already been filled by the time this goes to print in *AR*.

### CQWW SSB 2012

This was a 'non contest' for me this year. The majority of the VK4KW team were abroad or tied-up with family issues, so the station was eerily silent for the weekend. Somehow, it just seemed 'wrong'.

The weekend did not go to waste however, as a sub-set of the team worked on getting various antenna projects off the ground, ready for the next challenge.

Not so for John VK6XX though. He took part in the CQWW battle and worked almost 1,100 QSOs on 10 m during the contest, which might be a new record for zone 29 – which has stood since 1968 or so. Well done John!

VK6NC were prowling the bands – no shortage of operators there, as they claimed a score of some 4.4 million points for their efforts – despite PC problems.

Steve VK3TDX was in his shack again, concentrating on the higher bands for close to 1,400 QSOs for a claimed score of just over 1 million points. Bernd VK2IA/VK6AA managed to get his Butternut based station onto the air from a clothes line pole. 143 Qs and 36,000 points claimed! Nice!

Andy VK4MN had family issues to contend with but still managed to trawl 10 m for a few goodies and a claimed score of almost 86,000.

Miles VK6MAB braved the bands for his first outing into the CQWW contest world. The VK contest rookie worked nearly 300 stations for a claimed score of 112,000 after taking into account family duties.

Vlad VK2IM has long since lost his CQWW virginity. With a whole stack of station issues hampering his progress (including a wind damaged antenna and reports of poor audio!) Vlad did battle to grab close to 2,300 Qs and a claimed score of 2.5 million points. LF was noisy for Vlad, but it would appear that there is a noise source closer to home than Vlad had first suspected, as investigations led to 40 m and 80 m benefitting from turning off the power to the house!

Catherine VK4GH entered the contest for new prefixes, but found the haul sadly lacking this year. Entering the 'Assisted' section, Catherine kept an eye on the reflectors for some of the countries



that she was looking for, but the only one noticed was Ascension Island, which of course is difficult at the best of times, and impossible during the contest. Undeterred, Catherine contacted all but six zones - 22, 23 Madagascar, India to Mongolia area and four zones in Africa, but still no luck getting through the JAs to Jan Mayen. With 155 QSOs in the log, fairly evenly spread between 10, 15, 20 and 40, Catherine called it a day.

## RD Contest update

Corrections to list of rankings listed in November AR for the Remembrance Day contest:

1. VK3KTO should read VK3TKO
2. VK6AFW with 30 points was missed off the list of the Single Op CW section.
3. VK7ZGK with 100 points was missed off the list of the Single Op Phone section.

None of these 'typos' affected the total outcome.

Alan VK4SN

## Swansong

It is with this submission for AR that I bid you a fond farewell. I've been pounding the keyboard for AR for a relatively short time, but everything comes to an end - and my column contributions are no exception. I feel that it is time for me to move aside and make way for new blood. I'll still be contesting however and VK4KW will still be on the air from time to time. I hope that you multiply often and produce a huge log!

See you on the bands. 73.



Many thanks to Phil for his contributions to this magazine over the years. Ed.

# 32<sup>nd</sup> ALARA Contest - Results

Lesley R Smit VK5LOL - ALARA contest manager

The ALARA contest is always held on the last full weekend in August each year. The results of the 2012 contest are detailed below.

Congratulations go to Catherine VK4GH who is once again the top scoring YL overall; Ngaire ZL2UJT for being the top scoring DX YL; Gerald VK2HBG the top scoring VK OM and Bill ZL3VZ the top scoring ZL OM. Great work all of you.

Everyone who participated had a good time. There was a little more DX around this time with Catherine contacting two overseas ALARA members, Christa DJ1TE and Evelyne F5RPB.

Although Susan VK3UMM, our new magazine editor, tried to encourage more YLs to participate by sending out an email to all ALARA members reminding them about the contest, I still only received 22 logs, with no non-members, no club stations and no CW. Thanks for trying Susan.

I am pleased to award Margaret VK3FMAB the Foundation licensee trophy. Well done Margaret.

Let's hope conditions are good again next year and that we can make the contest a busy one.



## Results

Catherine VK4GH	846	Top overall, Top phone, Top VK4 ALARA member
Jean VK3VIP	674	Top VK3 ALARA member
Ngaire ZL2UJT	275	Top DX YL
Gerald VK2HBG	170	Top VK OM, Top VK2 OM
Jenny VK3WQ	142	
Lesley VK5LOL	135	Check log
Shirley VK5YL	133	Top VK5 ALARA member
Bill ZL3VZ	105	Top ZL OM
Marilyn VK3DMS	84	
Margaret VK3FMAB	81	Top Foundation Licensee
Dot VK2DB	76	Top VK2 ALARA member
Karen VK2AKB	69	
Christine VK5CTY	68	
Peter VK5KX	60	Top VK5 OM
David VK5KC	45	
Hans VK5YX	30	
Joy VK5BAR	20	
Celia ZL1ALK	20	
Matt VK2ACL	20	
Elizabeth VE7YL	15	Top Canadian ALARA member
Miles VK6MAB	15	Top VK6 OM
Evelyne F5RPB	5	Top French ALARA member

## Erratum:

On the inside back cover of the November issue, there was an error. The photo in the bottom right corner is of Michael Owen VK3KJ and Kelgo Komuro JA1KAB. Thanks to Nan Owen for the corrected information.

# Ross Hull Memorial VHF-UHF Contest 2013

Contest manager: John Martin VK3KM

The next Ross Hull Contest will run through the month of January 2013. Logs will be due by Friday, February 15.

There has been one minor change in the rules. For some years the scoring has been based on the best seven days as nominated by the entrant, so it isn't necessary to operate throughout the entire contest period. This year the "Best Two Days" section has been reintroduced. So if your operating time is limited, you may choose to enter only the two day section.

If you participate in the Summer VHF-UHF Field Day, remember that you can count Field Day contacts (one per station per band per day) in your Ross Hull Contest log, so the Field Day can supply two of your Ross Hull Contest days. There is no need to exchange separate serial numbers for the two contests.

## The Contest

The WIA maintains a perpetual trophy in honour of the late Ross A. Hull and his pioneering achievements in VHF and UHF operation. The name of each year's contest winner is engraved on the trophy, and other awards may be made in the various divisions of the contest. The contest is open to all amateurs.

## Duration

0000 UTC January 1, 2012 to 2400 UTC January 31, 2013.

In Eastern Summer Time, that is 11 a.m. on January 1 to 11 a.m. on February 1.

## Sections

- A: Best 7 days, analog modes.
- B: Best 7 days, digital modes.
- C: Best 2 days, analog modes.
- D: Best 2 days, digital modes.

Digital modes are defined as those in which the decoding of the received signal is done by a computer.

Entrants may submit logs for more than one section.

## General Rules

One callsign and one operator per station. Stations may operate from any location. You may claim one contact per station per band per UTC day. Repeater, satellite and cross-band contacts are not permitted.

Except for CW, no contest operation is allowed below 50.150 MHz. Recognised DX calling frequencies must not be used for contest activity. Suggested procedure for SSB stations is to call on .150 on each band, and QSY up to make the contest exchange. All rulings of the contest manager will be accepted as final.

## Contest Exchange

For Section A or C, Entrants must exchange RS (or RST) reports plus a serial number. Serial numbers need not be consecutive. *NOTE: For propagation modes such as meteor scatter or short-lived sporadic E openings, it is sufficient to exchange callsigns plus two further digits that cannot be predicted by the other station.*

For Section B or D, exchange callsigns plus two further digits that cannot be predicted by the other station.

While not an essential part of the contest exchange, Maidenhead locators may also be exchanged as an aid to distance calculations.

## Logs

Logs must contain the following for each contact:

- Date and UTC time.
- Frequency and callsign of station worked.
- Reports and serial numbers sent and received.
- Approximate location or grid locator of station worked.

Separate scoring columns for each band would be helpful.

## Scoring

Scoring will be based on the best 7 UTC days nominated by the entrant.

For each contact, score 1 point per 100 km or part thereof (i.e. up to 99 km: 1 point, 100 – 199 km: 2 points, etc.)

Multiply the total by the band multiplier as follows:

6 m	2 m	70 cm	23 cm	Higher bands
x 2	x 3	x 5	x 8	x 10

Then total the scores for all bands.

## Cover Sheet

Logs must be supplied with a cover sheet containing:

- Operator's callsign, name and address.
- Station location (if different from the postal address).
- Section(s) entered.
- A scoring table set out as the example below.

Date	6 m	2 m	70 cm	23 cm	etc
Day 1	xxx	xxx	xxx	xxx	xxx
Day 2	xxx	xxx	xxx	xxx	xxx
2 Day Subtotals	xxx +	xxx +	xxx +	xxx +	xxx = xxxxx (2 DAY SUBTOTAL)
Day 3	xxx	xxx	xxx	xxx	xxx
Day 4	xxx	xxx	xxx	xxx	xxx
etc.					
7 Day Totals	xxx +	xxx +	xxx +	xxx +	xxx = xxxxx (7 DAY TOTAL)

- A signed declaration that the station has been operated in accordance with the rules and spirit of the contest, and that the contest manager's ruling will be accepted as final.

Please use the following format for your scoring table. If you wish you can cross-check by adding the daily totals across the table, but please make sure that you include the separate band totals.

A cover sheet and scoring table has been included in the postings on the WIA web site. Copies can also be obtained from the e-mail address given below.

### Penalties

Minor errors may be corrected and the score adjusted. Repeated

use of recognised DX calling frequencies (especially when the reports indicate strong signals) may lead to disqualification. Inclusion of any false log entries will lead to disqualification.

### Entries

Paper logs may be posted to the Manager, Ross Hull Contest, PO Box 2042, Bayswater Vic 3153. Electronic logs can be e-mailed to [rosshull@wia.org.au](mailto:rosshull@wia.org.au). Acceptable log formats include: ASCII text, RTF, DOC, DOCX, XLS, MDB, PDF, or any Open Document format.

Logs must be received by **February 15, 2013**. Early logs would be appreciated.

### Note on Calculating Distances

Absolute accuracy is not required.

You just need to know whether each station is above or below the nearest multiple of 100 km, so you can use a compass to draw 100 km circles around your location on a map. Alternatively, you can use contest logging software that can calculate distances. If so, you will need to exchange 6 digit Maidenhead locators to get an accurate distance measurement. You can also calculate distances from six-digit Maidenhead locators using a computer program that is available on the Ross Hull Contest page of the WIA web site.

Note that a sample cover sheet with scoring table can be downloaded from the WIA website.



# Summer VHF-UHF Field Day 2013

Contest manager: John Martin VK3KM

## Third "F" Call Challenge

The Summer Field Day will include the third "F Call Challenge", with special certificates for Foundation licensees who participate in any of the single operator sections of the Field Day.

**Dates: Saturday and Sunday 12 and 13 January 2013**

Duration in all call areas other than VK6: 0100 UTC Saturday to 0100 UTC Sunday.

Duration in VK6 only: 0400 UTC Saturday to 0400 UTC Sunday.

## Sections

- A: Portable station, single operator, 24 hours.
- B: Portable station, single operator, 8 hours.
- C: Portable station, multiple operator, 24 hours.
- D: Portable station, multiple operator, 8 hours.
- E: Home station, 24 hours.
- F: Rover station, 24 hours.

## Operating periods

Stations entering the 8 hour sections may operate for more than 8 hours, and nominate which 8 hour period they wish to claim for scoring purposes.

## Entering more than one section

If a portable station operates for more than 8 hours, it may enter both the 24 hour and 8 hour sections. If the winner of a 24 hour portable section has also entered the corresponding 8 hour section, his log will be excluded from the 8 hour section.

If a portable or rover station spends part of the contest period operating from his home station, he may also enter the home station section.

## Two operators

If two operators set up a joint station with shared equipment, they may choose to enter Section A or B as separate stations under their own callsigns, or Section C or D under a single callsign. If they enter Section

A or B, they may not claim contacts with each other.

## Multi-operator stations

Portable stations with more than two operators must enter Section C or D. Operators of stations in Section C or D may not make contest exchanges using callsigns other than the club or group callsign.

## Rover stations

The Rover section is for all portable or mobile stations that operate from more than two locator squares or change locator squares more than twice.

## General Rules

One callsign per station. Operation may be from any location. A station is portable only if all of its equipment is transported to a place which is not the normal location of any amateur station. Portable stations may change location during the Field Day provided the station is dismantled and reassembled

each time it moves. You may work stations within your own locator square. Repeater, satellite and cross-band contacts are not permitted.

Except for CW, no contest operation is allowed below 50.150 MHz. Recognised DX calling frequencies must not be used for contest activity. Suggested procedure for SSB stations is to call on .150 on each band, and QSY up to make the contest exchange.

### Contest Exchange

RS (or RST) reports, a serial number, and your four digit Maidenhead locator. The Maidenhead locator is optional if it has already been exchanged in a previous contact during the Field Day and neither station has moved since then.

### Repeat Contacts

Stations may be worked again on each band after three hours. If either station is moved to a new location in a different locator square, repeat contacts may be made immediately. If the station moves back into the previous locator square, the three hour limit still applies to stations worked from that square.

### Logs

Logs should cover the entire operating period and include the following for each contact: UTC time; frequency; station worked; serial numbers and locator numbers exchanged.

### Scoring

For each band, score 10 points for each 4 digit locator square in which your station operates, plus 10 points for each locator square worked, plus 1 point per contact. Multiply the total by the band multiplier as follows:

6 m	2 m	70 cm	23 cm	Higher
x 1	x 3	x 5	x 8	x 10

Then total the scores for all bands.

### Cover Sheet

The cover sheet should contain the names and callsigns of all operators; postal address; station location and Maidenhead locator; the section(s) entered; the scoring table; and a signed declaration that the contest manager's decision will be accepted as final.

Please use the following format below for your scoring table.

In this example above the operator has operated from one locator and worked four locators on each band.

A blank cover sheet, with scoring table, is available on the Field Day page of the WIA web site.

### Entries

Paper logs may be posted to the Manager, VHF-UHF Field Day, PO Box 2042, Bayswater Vic 3153. Please email electronic logs to [vfhufh@wia.org.au](mailto:vfhufh@wia.org.au). Acceptable log formats include: ASCII text, RTF, DOC, DOCX, XLS, XLSX, MDB, PDF, or any Open Document format. Logs must be received by Monday, 28 January 2013. Early logs would be appreciated.

**FIELD DAY WEB SITE** - <http://www.wia.org.au/members/contests/vfhufh/>

This site includes the rules for the next Field Day, rules and results of all past VHF-UHF Field Days, cover sheets and scoring tables, and other information.



Band	Locators	+	Locators	+	QSOs	x	Multiplier	=	Band Total
	Activated		Worked						
	(10 points each)		(10 points each)		(1 point each)				
6 m	10	+	40	+	40	x	1	=	90
2 m	10	+	40	+	30	x	3	=	240
70 cm	10	+	40	+	20	x	5	=	350
etc.									
Overall Total									= 680

## CCARC

Central Coast Amateur Radio Club Inc.

# Wyong Field Day

## 24<sup>th</sup> February 2013

Lucky Door prizes, Flea market plus much more!

For more information go to the website  
[www.fieldday.org.au](http://www.fieldday.org.au)

Be part of the largest amateur radio event in the Southern Hemisphere!

# Technical Advisory Committee Notes

John Martin VK3KM

## Proposed two metre band plan changes - new digital repeater segment

In 2011, the WIA Board gave the Technical Advisory Committee the task of reviewing the two metre band plan and considering ways of improving the efficiency of spectrum use. In particular, the TAC was asked to consider the feasibility of adopting 12.5 kHz channel spacing in the repeater and simplex segments of the band.

The TAC circulated a discussion paper and a proposal developed by the National Repeater and Beacon Coordinator, Peter Mill VK3APO. This draft proposal was supported by the TAC regional representatives and was submitted to the Board along with a report and recommendations. The Board adopted the report and gave approval for these changes to be made.

The essence of the report to the Board was that it is not feasible to adopt 12.5 kHz channel spacing for existing FM repeater and simplex channels, where the equipment in use is all designed for 16 kHz occupied bandwidth and 25 kHz channel spacing. The result would

be unacceptable levels of adjacent channel interference. However it is feasible to use a 12.5 kHz channel raster for new digital modes that have narrower occupied bandwidth and are designed for 12.5 kHz channel spacing.

Due to the limited spectrum available, the only practical approach is to interleave 12.5 kHz channels in between existing 25 kHz channels, where this can be done without creating unacceptable adjacent channel interference. In particular, it is recommended that new repeaters using digital modes such as D-STAR and P25 should be allocated frequencies on odd multiples of 12.5 kHz, interleaved between existing 25 kHz spaced channels.

It was also recommended that to minimise interference, it would be desirable if these new repeaters using a 12.5 kHz channel raster were allocated input frequencies in a different band segment from that used by existing FM repeaters. The band segment 145.000 - 145.400 MHz was identified as being suitable for this purpose because it is only lightly used and has very few assigned frequencies. This

allows new digital repeaters to share the existing repeater output segment, but to use a transmit-receive offset of 1.6 MHz, which will eliminate the possibility of adjacent channel interference on their input frequencies.

This proposal requires a rearrangement of the band plan between 145.000 and 145.400 MHz. This can be done with minimal effect on existing operation in this segment. A transition plan has been developed which will have no effect on any existing packet, APRS or WICEN allocations. However it does entail a change for one of the frequencies recommended for simplex D-STAR operation.

The proposed changes are described in detail on the Band Plans Update page of the WIA web site. The posting includes the original report and recommendations adopted by the WIA Board.

The report also includes other recommendations on spectrum efficiency and the problem of overcrowding of the two metre repeater segments.

## Silent Key

Valda Catherine Trenberth VK3DVT

I regret to inform you of the sudden death of my sister Valda VK3DVT on 8/10/2012.

Valda was confined to a wheelchair and she achieved her novice call VK3VUO at her first attempt in August 1980 with coaching by correspondence from her brother-in-law Brian Austin VK5CA, and her full call VK3DVT at the next exam in April 1981 with coaching by Geoff Taylor VK5TY.

Valda joined ALARA and for five years was their Treasurer, Souvenir Custodian

and Sponsorship Secretary. She designed the contest certificate and banner, and QSL cards for friends and relatives, also produced hundreds of hand drawn and hand coloured front covers for the 10th anniversary edition of ALARA's newsletter in 1985.

She took part in two Intruder Watch special reporting surveys for the IARU, when approximately 150 people (including SWLs) took part around the world 1990-1991, which involved listening on air for 2 hours at a time throughout the night and day.

Valda made many friends worldwide - South Africa, England, California, New Zealand, and achieved her DXCC with over 200 countries in 1994. She enjoyed the RD and ALARA contests too, and the YL net.

She was a thoughtful and generous person, and we miss her.

Vale, Valda.

Marlene Austin VK3EQO, previously VK5QO.





Sunraysia Radio Group (SRG) is named after the region of north-western Victoria, with Mildura as the largest centre. Mildura is a beautiful city, laid out by the Chaffey Brothers in the late nineteenth century; Nicholls Point, the home of the SRG, is a settlement on the eastern boundary of Mildura.

The SRG clubhouse is in the Stephen 'Syd' James Hut adjacent to the Sunraysia District Activity Centre in a particularly attractive part of Nicholls Point with lovely grounds and trees. The hut was built some time back when materials and money were scarce commodities; the internal areas are well lined and the hut is comfortable with two main rooms.

Radio equipment includes a Yaesu FT-847 and power supply, part of the equipment kindly donated by the late Robert Farnsworth's VK3BHI family. It also included a broad band dipole for HF.



Photo 1: The SRG clubhouse at Nicholls Point – note the antennas on the roof.

SRG club members constructed two 2 m/70 cm J-Poles and a working bee saw the erection of a guyed mast to carry the J-Poles and support the HF dipole.



Photo 2: John VK2AWJ with Josh and Kate.

The Sunraysia scouts financed the purchase of two TF-60R HT transceivers, an FT-897 transceiver and an AV201 SWR meter.

### JOTA

The JOTA weekend had many Scout and Guide participants with contacts being made by HF radio and through the local VHF repeater, assisted by local amateurs including Noel VK3FI in Nicholls Point and John VK3TCT, who operated remotely from Queanbeyan NSW through to the local VHF repeater. In attendance assisting the young people were John VK2AWJ, Max VK3ZMT and Ray VK3HSR; a good introduction to amateur radio and I must say I was impressed by some of the young people's use of the phonetic alphabet.

### New Foundation licences

Saturday 13th October was assessment day, conducted at the SRG clubrooms. Eight candidates passed the practical assessment and six passed the theory assessment. Four were from the Scout Association, and two from the wider community.

Congratulations to the six participants and we do look forward to hearing them on air in the near future. Thank you to the Assessor Noel VK3FI and Learning Facilitator John VK2AWJ.

With these results, 'Amateur Radio' and 'JOTA' is alive and well in the Sunraysia region.



**Participate**

**Summer VHF-UHF Field Day**

**12 - 13 January**

**Ross Hull Memorial VHF-UHF Contest**

**1 - 31 January**



## VK7news

Justin Giles-Clark VK7TW

e vk7tw@wia.org.au

w groups.yahoo.com/group/vk7regionalnews/

### Remembrance Day Contest

Huge congratulations to all VK7 amateurs who participated and submitted logs for the Remembrance Day Contest 2012. Under the new scoring method VK7 won the 2012 contest with a score of 7.15. The accolades don't stop there - congratulations to Wayne VK7NET who came first in the Single Operator Phone Section and Bob VK7RF who took out the Single Operator CW section.

### VK7 10 GHz experimentation

Rex VK7MO has been at it again with the first 10 GHz QSO from Hobart to VK3. In VK3 was Rhett VK3GHZ near Bairnsdale and Rod VK3BQJ at Swan Reach. This was a distance of around 560 km using aircraft scatter and the WSJT JT65c mode. Congratulations to Rex, Rhett and Rod. Not stopping there - Rex went on to use his 80 cm dish as a 10 GHz portable station to make an EME digital contact with OK1KIR at a period of low lunar libration. At the time of writing there were many 10 GHz rain scatter experiments going on across Tasmania with Joe VK7JG and revealing some exciting results. Watch this space and congratulations to Rex and all involved.

### Repeater News

Joe VK7JG reports that the replacement VK7RAE 10 m (28.267 MHz) beacon is back on air from Don Heads near Devonport. Thanks to Scott VK7NWT for the donation of the beacon radio. Hayden VK7HA reports that repairs are being made to the VK7RCH 70 cm (438.575 MHz) on Grey Mountain in the Huon

Valley as the weather improves over summer. TLC has also been performed on the VK7RMM APRS Digipeater in the NW.

### Cradle Coast Amateur Radio Club

We congratulate Marlene Gardiner VK7FEMA who recently passed her Foundation licence exam. At the same exam session Dick VK7LDK and Stephen VK7VHF passed their exam and upgraded to a Standard licence. Steven also passed his Advanced licence exam and will be VK7LA.

The October CCARC meeting saw the new mobile radio field trailer donated by Rick VK7FRIK who was also given a certificate of appreciation at the meeting. There are some important events coming up in 2013 for CCARC. A Field Day on February 17, 2013 and on March 3, 2013 the Pure Tas Cycle Challenge, for which the club will be providing communications.

### Northern Tasmania Amateur Radio Club

The NTARC October meeting was held at the Mt Barrow Interpretation Centre at the foot of Mt Barrow. Even though snow was down to 600 m on surrounding mountains, it was not as bad on Mt Barrow and the fire burned warmly with food and amber refreshments flowed! In all 13 members enjoyed the night and some stayed on until the morning and thanks to Yvonne VK7FYM for that report.

Peter VK7KPC, the NTARC's JOTA/JOTI Co-ordinator let me know that the NTARC JOTA activation included two HF stations and a VHF/UHF station. There were 12 Scout groups go through during the weekend. Many Scout/Guide stations on the mainland were contacted and a notable contact was with a Group Commissioner in Vancouver Canada via EchoLink.

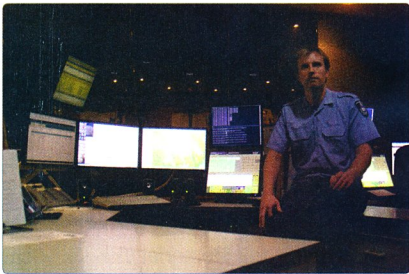


Photo 1: Holger VK7KI explains fire alarm technology. Photo courtesy of VK7TW.

Thanks to Norm VK7KTN, Kevin VK7HKN, Tony VK7YBG and Peter VK7KPC for their efforts over the JOTA weekend.

### North West Tasmanian Amateur TV Group (NWT-ATVG)

JOTA in NW Tasmania was held at Paton Park which hosted a HF and VHF station with contacts being made to VK3, VK5 and VK7. VHF utilised IRLP and EchoLink nodes for contacts via the internet. Thanks to Paul VK7HPD, Neil VK7NX, Ross VK7WP, Graham VK7NGA and Tony VK7AX for their efforts.

### Radio and Electronics Association of Southern Tasmania

REAST visited the Tasmania Fire Service (TFS) Headquarters. The night started with a demonstration by Holger VK7KI on how fire alarms past and present work including the modern day 3G wireless with redundant dial-up capability. The TFS monitor and respond to over 2000 fire alarms around Tasmania. We then toured the Communications Centre thanks to Tiffany and Michael (Comms Centre Supervisor) and finished up with a tour of the firefighting appliances with firefighter Brendan.

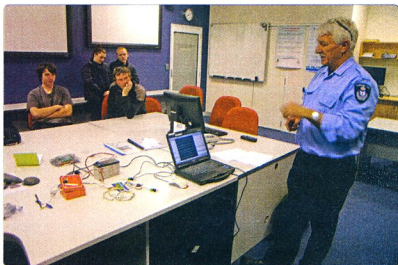


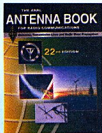
Photo 2: Anders VK7FAJM explains the technology behind a Communications Centre work station. Photo courtesy of VK7TW.

Thanks to Anders VK7FAJM who took us through the radio network and organised the night's activities.

REAST's DATV Experimenter's nights over the last month have seen some great VK7 history with early pioneer Pop Medhurst's story coming to light. Other interesting segments included Raspberry Pis, W. Heath Robinson comics, Warren VK7FEET on his recent NZ experience on the self-balancing, motorised platform Segways.

Rex VK7MO entertained our audiences with his recent 10 GHz experiments. PCB manufacturing with the author along with CTCSS and optical preamps and many interesting videos have been broadcast. We stream our content on batc.tv – members stream VK7OTC – see you there!

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## VK2news

Tim Mills VK2ZTM  
e vk2ztm@wia.org.au

As the end of another year approaches Seasons Greetings, where did the year go! The end of the year and the start of the next is when many radio clubs drop the meetings, often not resuming until February. All clubs are requested to send off an item to VK2WI News at [news@arnsw.org.au](mailto:news@arnsw.org.au) with meeting and holiday break arrangements. Check with your local club for their arrangements.

VK2WI News will drop the evening transmission from 30th December for two or three weeks; the schedule not yet advised as these notes were being prepared. It will be morning only at 10 am until about mid-January. The first of the 2013 Trash and Treasure events at VK2WI will be on Sunday, 27th January with some adjustments to the times. Ideally the T&T will start about 9.30 am and the HomeBrew gathering will come forward an hour to 12 noon. In early March 2013 ARNSW will be calling nominations for the committee. The AGM is set down for Saturday morning, 20th April, 2013. An anniversary BBQ is planned for Sunday, 10th March, 2013 at the Dural site. The schedule for Foundation courses and upgrade classes are yet to be advised. Check out the ARNSW web site at [www.arnsw.org.au](http://www.arnsw.org.au) for announcements.

ARNSW recently circulated their members to seek their current callsign and name for a membership badge. More than half the membership responded by the cut-off point at the end of October. Most badges should have been distributed by now. Recently improved toilet facilities were added to the Dural site with a unit suitable for the disabled.

The upgrade of the VK2RWI main repeaters should now be complete with stronger voices and better ears on six metres 53.850 MHz, two metres 147.000 MHz and 70 cm 438.525 MHz. Consideration is being given to re-establishing the 10 metre repeater. The former system went out of service some years back when equipment at the remote receiver end was stolen.

Various upgrades at the VK2WI site have seen many changes in the equipment. Last year the 160 metre AM transmitter was replaced with a more modern unit. Now surplus to requirements is the former transmitter. It is an AWA J54/800, commissioned in its original life in 1951; it is being offered free to anyone who would like to give it a new home. It is not operational as some of the shielded rubber wiring has perished and shorted to its braid. It will be available for personal

collection from the Dural site. The successful applicant will need to provide transport and labour. It's all up weight is about 1000 kg in two cabinet units on wheels and a base frame. Dimensions are 1850 mm high, 1060 mm wide and 850 mm deep. Expressions of interest may be emailed to [disposals@arnsw.org.au](mailto:disposals@arnsw.org.au) with the deadline on 10th December, 2012. A ballot may be necessary.

The Central Coast ARC has been celebrating 55 years of existence by resurrecting the Central Coast Award. Contacts are required with any of the three club stations – VK2AFY, VK2EH or VK2WFD. There are multipliers if you work a CCARC club station when it is taking part in a contest or a special event. There's another multiplier if you are running QRP or have a Foundation call. So check the contest section of the CCARC website at [www.ccarc.org.au](http://www.ccarc.org.au) for all the rules. It is now about three months until the famous Wyong Field Day to be held on Sunday, 24th February, 2013. Check details on [www.fieldday.org.au](http://www.fieldday.org.au) or phone 02 4340 2500.

See you next year.  
73 – Tim VK2ZTM.



## Erratum: The 'Porta 40' direct conversion receiver

The author Peter Parker VK3YE advises that the receiver circuit (Figure 1) published in November 2012 AR (page 10) contains an error.

The 6.2 V zener diode in the oscillator was shown reversed polarity and should be the other way around.

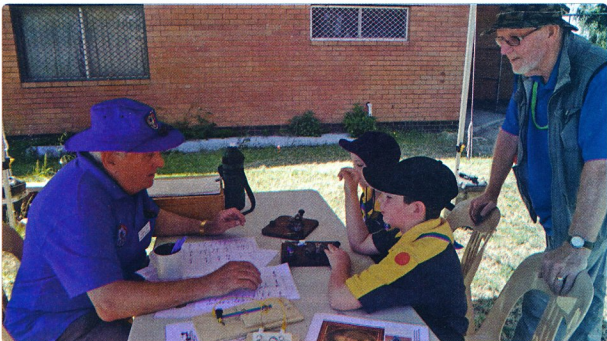


Photo 1: The PARG at JOTA/JOTI 2012. VK6SN is at the 'helm'.

Firstly, as it's the December issue, I'd like to wish all readers and their families the compliments of the season, and best wishes for 2013.

Now news from the very active Peel group.

## Peel Amateur Radio Group (PARG)

On Saturday 20th October the PARG operated the most successful JOTA station the region has seen in over ten years. The group callsign VK6ARG was constantly on the air from midday through to midnight. Eighty scouts, guides and leaders were kept busy throughout the day, at the Peel district JOTA/JOTI station. For 2012 the station was located at Rockingham Scout hall, on the coast in Western Australia. This year's success stories included Morse code training, HF radio and EchoLink.

Our group benefitted from the assistance of recently joined members Martin VK6MJ (ARISS

contact specialist), Sergey UV9VO, Clive G4JXJ and local amateur Stephen VK6GOS. Just before midnight, whilst attempting to close the station down we received possibly the best contact, a portable G3 call from Gilwell Park in the UK, the home of Scouting!

Throughout the day the station utilised a temporary EchoLink node VK6MJ-L, which made the 23 km path up to Rockingham Scout Hall via VK6MJ's purpose built satellite antenna. After the Peel JOTA/JOTI station closed the satellite antenna was realigned with the approaching International Space Station for an ARISS contact set for 0200 hours WA time.

Thanks and 73, Paul VK6LL.

## Special JOTA contact with the International Space Station by Martin VK6MJ

Scouts visiting the National Scouting Museum in Irving,

Texas spoke with Sunita Williams KD5PLB via amateur radio on the International Space Station (ARISS) on Saturday, 20 October. The contact was part of the Jamboree on the Air (JOTA) weekend event whereby scouts of all ages from around the world connect with each other using amateur radio equipment. Williams was able to answer over 20 questions put to her by the Scouts and had time for longer than usual answers due to sharing of the contact by Australian telebridge stations VK6MJ and VK5ZAI. The audience consisted of around 200 Scouts, parents, and friends and at least three television stations and several newspaper representatives were present.

They have been busy down south!

Now in them there Hills.





Photo 2: Maintenance work at the HARG. Heath VK6TWO installs the 40 metre traps on the HARG beam.

## The Hills Amateur Radio Group (HARG)

Hello. This is Bill VK6WJ with news from HARG.

Firstly, I'd like to send a very warm welcome to all those amateurs who joined the club in recent months. Welcome to Miles VK6MAB, Ray VK6ZRW, Graeme VK6LV, Bill VK6HWP, Peter VK6AIF, Dave G7GPR and Dot who is the XYL of Ron VK6HRB. That's right, we now have a family membership category. Once one member of a family belongs to the club another family member can join for half the annual fee. Also a very warm welcome back to John VK6MAD, who has returned from Queensland and is now a regular at meetings once again.

On Saturday 27th October we had a very busy day at the club. In the morning we used a cherry picker to re-tune the six metre beam, to repair a wind damaged element on our four element TET-EMTRON HF beam and to add 40 metre traps to

the HF beam. This gives us 7, 14, 21 and 28 MHz capability from the one beam. We also have a G5RV HF multi-band dipole for 80 metres and above plus vertical antennas for VHF and UHF. Now that the antennas are fully operational again we are looking forward to using our new Ameritron amplifier to work some rare DX and take part in as many contests as possible. The CQ WW DX contest came at just the right time to test out the new gear. We had the antenna and linear running hot all weekend!

At lunchtime we held our usual sausage sizzle complete with barbecue sauce and convivial chat and in the afternoon Rob VK6UFO gave us a talk on the APRS system, including details on our own system installed in the club shack. Heath VK6TWO brought along a wide range of APRS hardware to allow members to see what was available and how to use it.

In January 2013 HARG celebrates its 30th Anniversary.

We have applied for a special commemorative call sign and will be on air with it from January onwards.

Don't forget that we now have a sausage sizzle at 1.00 pm before every meeting with the meeting itself starting at 2.00 pm. Social meetings on the second Saturday of the month and general meetings on the last Saturday. For more information go to [www.harg.org.au](http://www.harg.org.au)

73 until next time from Bill VK6WJ.

Miles and his son operated JOTA and passed this on:

## JOTA activation at 1st Bayswater Sea Scouts

Miles VK6MAB and 11 year old son Davis VK6FAME operated from the 1st Bayswater Sea Scouts hall on the picturesque Swan River for JOTA this year. Whilst guest operator numbers were down, they stirred plenty of interest from passers-by, asking about amateur radio and what JOTA was all about. Thanks to everyone who made contact with them.

**NCRG News**

The club has been busy in contests of late with an excellent single band/ single operator entry in the Oceania DX SSB Contest with the call of the late Neil Penfold VK6NE as the contest call. The club now holds this callsign in memory of Neil, and in the hope that one day one of his family will ask for it back!

As many of the clubs contest operators were out of the country or holidaying elsewhere or tied up with family commitments a decision was made to do a 15 metre single band/single operator entry this year. Wes VK6WX did the operating on the clubs behalf. The band died in the wee small hours but he made a good score of over 740 contacts. A great effort Wes!

We also put a 48 hour effort into CQWW SSB with several operators and VK3FY slotting in at the end of his trip to VK6. I believe the score was one of the best we have ever achieved and as I'm writing



Photo 4: Eric VK6FEDS and Larry VK6NOL hard at it!

this three hours after the contest finished, I don't yet have the full details.

Recently we had a visit from Mark VK6KMJ who was a member

20 years ago in the Carine College days. He gave us a fascinating presentation on high altitude balloons carrying APRS and cameras. He showed us footage of the video cameras mounted on these balloons and invited club members to join him on his next launch and assist with the HF tracking of the payload.

Amazing stuff! Several members expressed an interest in joining the project.

The club has also been busy

putting up new towers, antennas and generally cleaning the place up a bit. The car-boot sale will have taken place by the time you read this report; hopefully it will have been a success and well attended. We have also welcomed some new members of late and they are looking to contribute to our activities.

Season's best wishes to all from the NCRG.

There was to be a section here on the activities from Wireless Hill for the centenary celebrations but there was so much going on that a separate article will appear elsewhere in the magazine; don't forget to have a read of it and see the pictures!

Hopefully the newly re-formed Bunbury group will soon come forward with a report of their activities! Hey, Alek!

Once again Season's greetings to all amateurs and their families, and I wish you all good DX for 2013 especially as it is to be just about the peak of this Solar Cycle.

Vy 73 Keith VK6RK

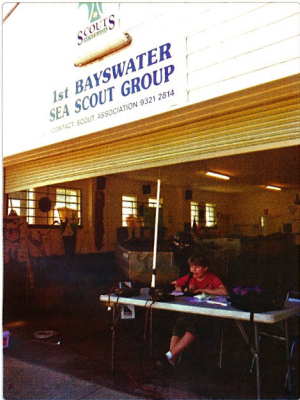


Photo 3: Davis VK6FAME in action from the 1st Bayswater Sea Scouts Hall.



# Hamads

## WANTED - COPIES OF RAOTC MAGAZINES - OTN



The WIA Archive is seeking copies of OTN magazines to add to the limited number it presently holds. OTN is the journal of the Radio Amateurs Old Timers Club which was founded in 1975 and is affiliated with the WIA. It was first published during the 75th Anniversary year of the WIA in 1985 and the first editor was WIA Historian and Past Federal President, Max Hull VK3ZS. The current Editor is previous AR Editor, Bill Roper VK3BR who has just published the 50th edition of the journal.

OTN is crammed with historical articles and reminiscences, many pertaining to Australia and although it is available from the RAOTC in pdf format on DVD, the Archive would like to hold a complete set of printed editions for future researchers.

So if you are currently down-sizing, or need more shelf space and are considering disposing your OTN collection, please think of the WIA Archive.

If you can help us locate some of these significant Australian magazines, please contact Peter VK3RV (WIA Historian) via email [vk3rv@wia.org.au](mailto:vk3rv@wia.org.au) or c/o the National Office in Bayswater

## FOR SALE - NSW

### Amateur radio gear

MDS Down Converter, \$5

Hills Telomast, 12.2 metres (40') in four extendable sections, \$50

### Satellite Receivers

Humax IRCI 5400, \$50

UEC DSD660, \$50

Nokia 9500S with DVB2000 software, \$50

Xanadu DSR, \$15

Winersat WR920 analogue receiver (dish and Polarator feed controller), \$10

### Other Satellite parts

Chaparral C-Band Polarator feed with Norsat Gold 15K C-Band LNB, \$45

Chaparral CoRoTor II C/Ku feed fitted with Norsat Gold 15K C-Band LNB and Gardiner 0.7dB Ku LNB, \$80

Chaparral Model C Ku LNB, 9.75/10.75GHz LO's, \$10

ACESAT Twin Ku LNB's, \$20 each

California Amp Ku LNB, \$10

Sharp Ku LNB's, \$15 each

DX Antenna DSA527N Ku LNB, \$5

DX Antenna DSA527D Ku LNB's, \$5 each

60.96 cm (24") actuator \$20

Zinwell SAB-09C Coax Relays, \$10 each

4 x Irdeto CAM's, not CI, various ages and S/W, \$5 each

Other miscellaneous parts, feeds, Power inserters, DiSEqC switches, negotiable.

### Other

Laser disc player, analogue, Pioneer LD V4300D, free

Contact Roger Woodward VK2WW at [VK2WW@Hotmail.com](mailto:VK2WW@Hotmail.com) or phone 02 9546 1927.

Three element (20/15/10) beam partially assembled, and needs a good home. I also have several lengths of six metre aluminium pipe. \$150 the lot. Pick up from Mudgee, NSW area.

Contact Janos Farkas VK2BFA QTHR, by phone on 02 6373 3589 or email [janosfar@hotmail.com](mailto:janosfar@hotmail.com)

## WANTED - NSW

I am looking for a Collins AM/CW transmitter such as the 32V-1, 2 or 3. I would prefer in operational condition, or at least complete. Please advise condition, location (this is no lightweight!) and price. Photos would be most appreciated.

Contact Steve Beveridge VK2LW by email [steve.b@internode.on.net](mailto:steve.b@internode.on.net) or mobile 0412194513.

A 1155 RX or AR8 RX, or any other World War 2 receivers.

Contact Nick Pritchard on 02 9477 2134.

## FOR SALE - SA

ESR Meter parts - Complete parts kit, \$69.95 plus postage. Order on-line from Aztronics Pty Ltd, 170 Sturt St, Adelaide, 5000. Phone 08 8212 6212 or at [www.aztronics.com.au](http://www.aztronics.com.au)

PCB only, \$10.00 plus postage. Order on line from VK5JST, [www.users.on.net/~endsodds](http://www.users.on.net/~endsodds)

## FOR SALE - WA

I have a few brand new reels left from cabling up my new property. This coax has -

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This was the best quality I could source and it will stand up to scrutiny. I will happily post you a sample if you are genuinely interested. Asking \$2.50 per metre, or \$200.00 for a 100 metre reel.

Contact Richard VK6TT on 0402 299 466, or at [vk6tt@burden.id.au](mailto:vk6tt@burden.id.au)



## Contributions to Amateur Radio

*AR* is a forum for WIA members' amateur radio experiments, experiences, opinions and news.

Your contribution and feedback is welcomed.

Guidelines for contributors can be found in the *AR* section of the WIA website, at <http://www.wia.org.au/members/armag/contributing/>

Email the Editor:  
[editor@wia.org.au](mailto:editor@wia.org.au)

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Gilbert Hughes VK1GH

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\* Denotes Committee Chairman

\* Denotes nominated by the WIA Board  
(\*Nominated Member\*)



## The Wireless Institute of Australia

ACN 004 920 745

## Election of Directors - Call for Nominations

The WIA wishes to call for nominations for four Directors positions falling due on the 25th May 2013.

The four Directors positions are declared vacant at the conclusion of the next Annual General Meeting which will be held at Fremantle, WA on the 25th May 2013.

The position previously occupied by Michael Owen (SK) is one of those due for re-election and remains vacant at this time.

### Nominations are hereby called to fill these vacant Director positions.

Trent Sampson and Ewan McLeod have offered themselves for re-election.

Philip Adams is retiring and has indicated he will not stand for re-election.

A Director must be a voting member of the WIA and must hold an Australian amateur radio licence.

Any person wishing to nominate as a candidate for election as Director of the WIA must deliver or cause to be delivered to the Returning Officer by not later than 31 January 2013:

A statement signed by the candidate signifying his or her willingness to be a candidate for election as a director together with;

the full name, age, occupation and callsign of the candidate, and  
such other biographical details or other information as the candidate wishes to accompany the ballot papers, but in all not exceeding 250 words.

Such information provided may be published in *Amateur Radio* magazine and on the WIA website.

Delivery to the Returning Officer may be by hand when the WIA national office is open at:

Unit 20  
11-13 Havelock Road  
Bayswater  
Victoria 3153

or by mail to:  
PO Box 2042  
Bayswater  
Victoria 3153

### Nominations received by facsimile or by electronic means cannot be accepted.

Pursuant to clause 14.1 (c) of the Constitution the WIA Board has determined that if an election is necessary the election of directors shall be conducted by postal ballot.

**Geoffrey Atkinson VK3AFA**  
Returning Officer



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